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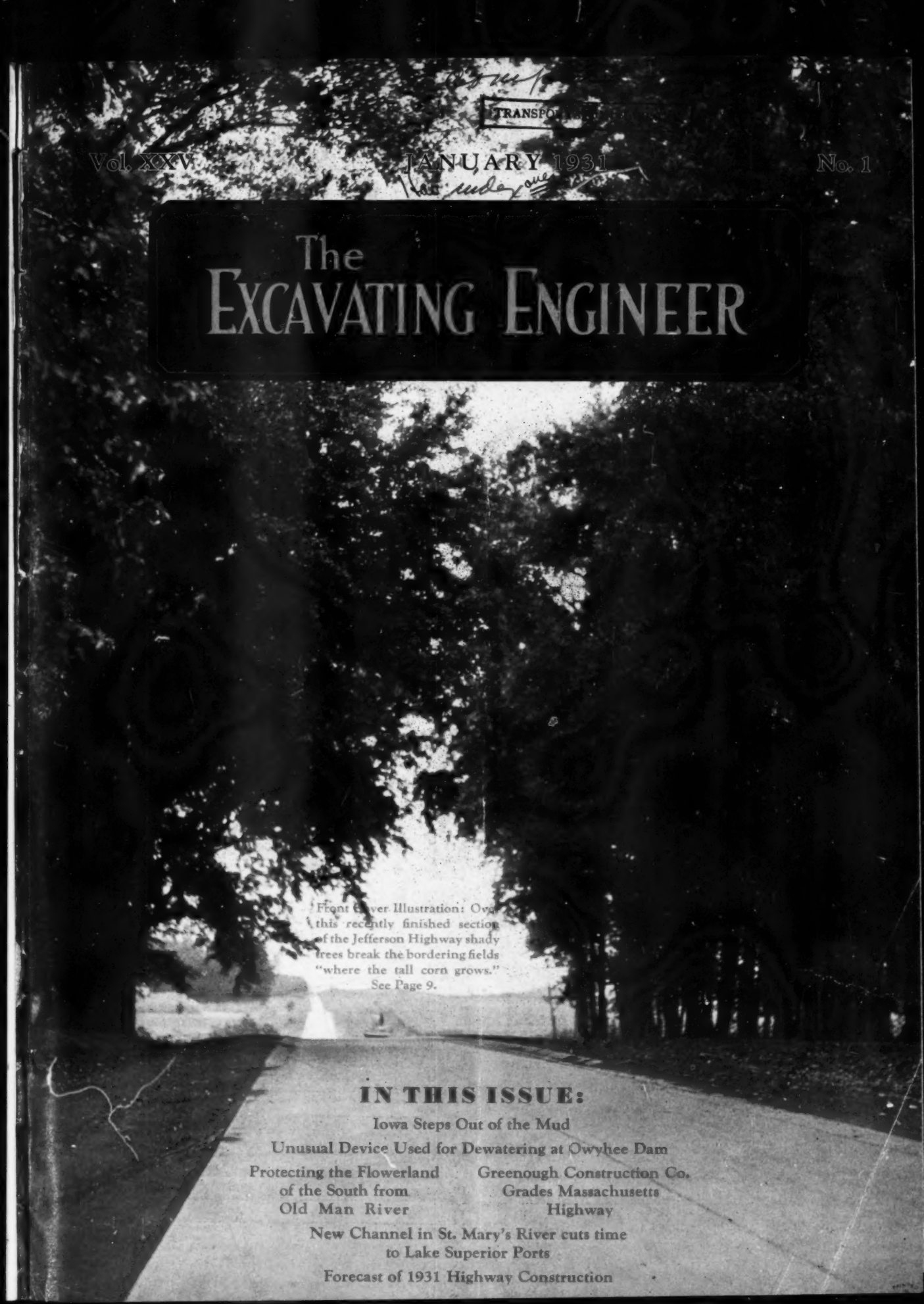
Vol. XXV JANUARY 1931 No. 1

The EXCAVATING ENGINEER



Front Cover Illustration: Ov... this recently finished section of the Jefferson Highway shady trees break the bordering fields "where the tall corn grows." See Page 9.

IN THIS ISSUE:

Iowa Steps Out of the Mud

Unusual Device Used for Dewatering at Owyhee Dam

Protecting the Flowerland of the South from Old Man River

Greenough Construction Co. Grades Massachusetts Highway

New Channel in St. Mary's River cuts time to Lake Superior Ports

Forecast of 1931 Highway Construction

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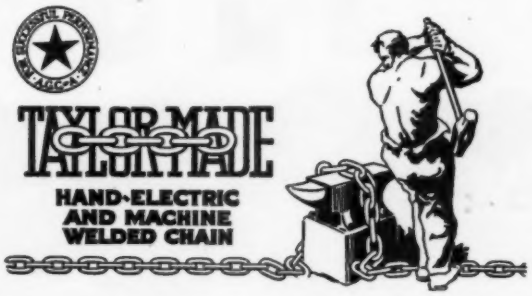

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Vol 25 — JANUARY 1931 — No. 1

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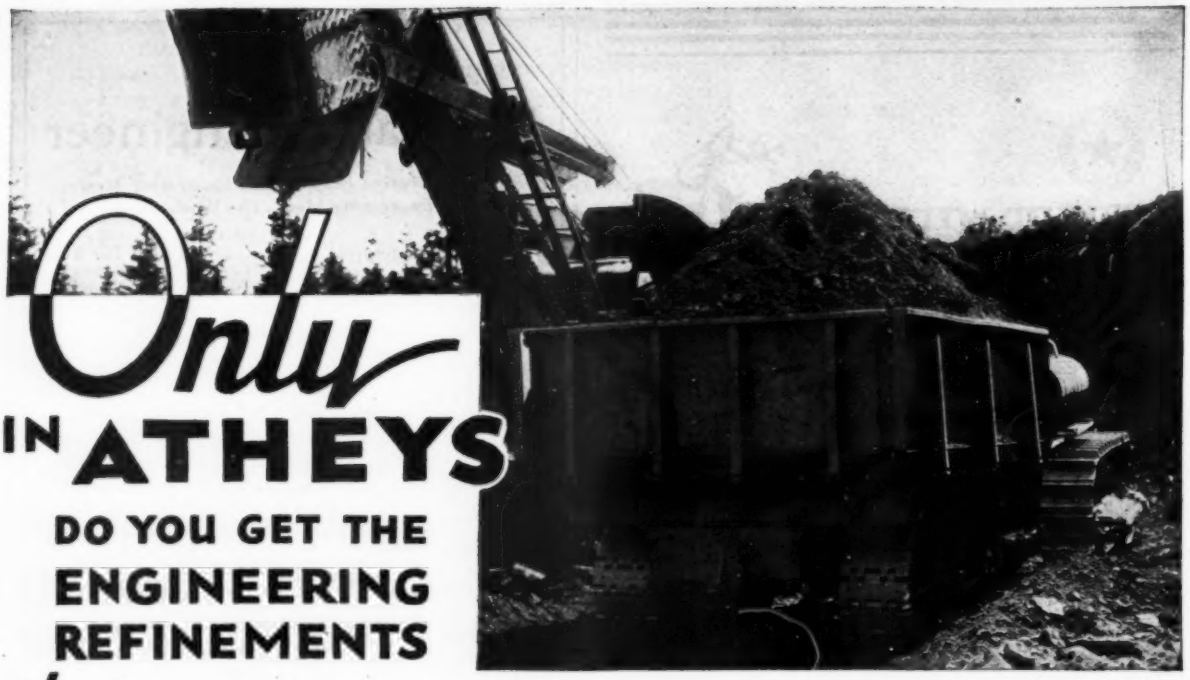

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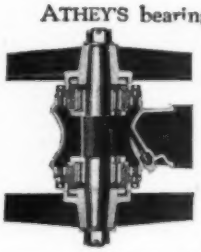

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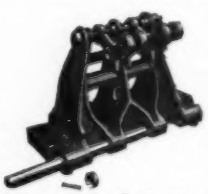

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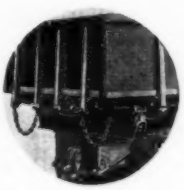

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Material handling with Anderson & Empie and Grading with J. A. Dunkle Construction Company

The EXCAVATING ENGINEER

Vol. XXV JANUARY 1931 No. 1

Iowa Steps out of the Mud

Anderson & Empie and J. A. Dunkle Construction Company contribute to success of Iowa's extensive highway program.

A nice clean ditch behind the draglines; an even shoulder where the Caterpillar with its blade had passed — but little dirt to move with the finishing gang.

FOR THE RESIDENTS, visitors and tourists who pass through the tall-corn state, 1930 will go down in history as the year Iowa stepped out of the mud. And those whose past experience includes travels through the sticky, heavy gumbo of Iowa's rain-soaked dirt roads will appreciate the tremendous value to Iowa farmers and visitors of the hundreds of miles of paved and well graveled roads built, and building as a result of the $100,000,000 bond-issue program started in 1929.

Anderson & Empie turn out paving records

Of the 1040 miles of paving finished in 1930, one of the many sections was thirty-seven miles on 65 between Colo and Iowa Falls. The main highway carrying the heavy traffic between Des Moines and Minneapolis is part of the Jefferson Highway which stretches from Winnipeg to New Orleans.

Paving on the entire 37 miles was handled by Anderson & Empie, well known contractors of Marshalltown, Iowa. Two of their outfits were used on this job at the time of our visit, one paving south from Iowa Falls, the other working out of Hubbard on a 13½ mile section consisting of 4½ miles south, 8½ miles north and a half mile through the town. The slab laid was 18 feet wide and seven to nine inches thick.

On the latter section their materials handling plant at Hubbard consisted of a Bucyrus-Erie 1030

On the Opposite Page

1. Unloading stone to stockpile with Bucyrus-Erie 1030 dragline. 2. Sure control spots the Blaw-Knox bucket accurately and permits cleaning the car with very little hand work on the part of the two car men. 3. It took 30 minutes to unload a 65-ton car of stone. 4. She'll be dead on center when the pull-line slacks. 5. Capacity loads were taken to the dump every trip. 6. Bull's-eyes were the rule though the Fords gave small targets. 7. Easy digging in this soft, black soil. 8. Two buckets make a heaping load. 9. Note the accurately sloped ditch and shoulder.

clamshell-crane with 1-yard Blaw-Knox bucket and Blaw-Knox bin and batcher. The 1030 unloaded cars of crushed stone shipped in from a quarry at Alden, sand from Marshalltown, and the steel reinforcing. The aggregate was handled from cars to bin or stockpile and from stockpile to bin.

33 cars of stone and sand unloaded by Bucyrus-Erie 1030 in 12 hours

Time required for unloading a 50 to 60-ton car of sand was from 14 to 20 minutes. Sixty-five-ton cars of rock took 30 minutes. Record outputs for the job with this machine were 33 cars of crushed

Crowded between telephone pole and shoulder, the 1930 dug in here without hesitation though she had to work well over "on her ear."

stone and sand in 12 hours, 30 cars of sand in ten hours.

1369 feet of 18 foot slab in 12 hours

From the Blaw-Knox batcher, material was loaded to 36 to 40 hired trucks, mostly Cheveys and Fords with some Internationals, for hauling to the mixer — a Koehring 27-E. Twelve hundred to 1350 feet of paving were poured per day with a record of 1369 feet in a 12-hour shift. At the time of our visit this outfit had just completed a two-weeks' run of three miles in a total of twelve, 12-hour shifts and 6 miles in the last thirty days.

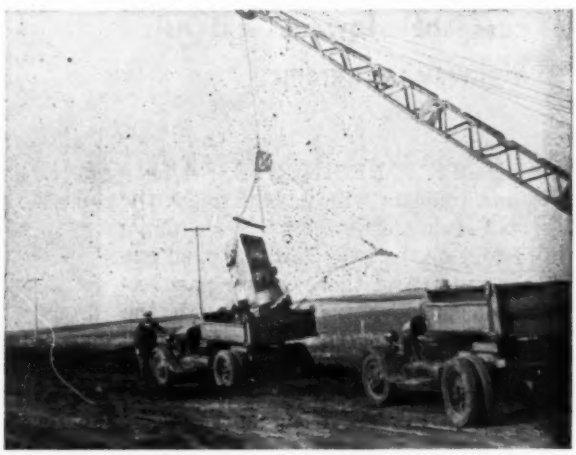
Much credit for this excellent performance is due to Superintendent J. R. Sweeney, Plant Foreman Russ Catron, Grade Foreman I. M. Celsi, Mixer Foreman Charles Riggles, and 1030 Operator R. C. Hurst.

Mr. Hurst has run all makes of cranes but, in commenting on the 1030's performance in always keeping a steady flow of materials going to the mixer crew, says, "The Bucyrus-Erie 1030 is the baby for me. Easy to take care of and easy to operate and you can bet your last dollar that when you need her she's always right there. Her Wisconsin motor uses from 35 to 40 gallons of gas a day and I change oil twice a week but never add any. This is her third summer and she runs as smooth as can be, though her engine hasn't even been overhauled. Her valves have been ground once, that's all."

Operator R. C. Hurst. "The 1030's the baby for me!"

Before moving in on the Hubbard section, this Anderson & Empie outfit completed about 10 miles of paving in Lynn and Burton counties on Highway 11.

The second Anderson & Empie crew originally set up at Zearing, then moved to Colo and then to



The dual-tired Fords did not give an overly large mark to shoot at, but Operators Holzer and Swart on the 1030's make a bull's-eye every time.

Iowa Falls. This crew, which did some very good work, was in charge of C. A. Radcliff, Superintendent; W. F. Hathaway, Plant Foreman; Ed. Allen, Grade Foreman; Arnold Larson, Mixer Foreman; and A. A. Biggerstaff, Northwest crane operator.

J. A. Dunkle Construction Company handles grading on same section

Cement for the entire paving contract was furnished by The Northwestern Cement Company of Mason City, Iowa. The 37 miles required 750 carloads of 200 barrels per car.

Behind the paving outfit, J. A. Dunkle Construction Company of Webster City, Iowa, followed up

with a grading crew building shoulders and opening the ditches. They also handled the grading ahead of the pavers. Their contract for completing all of this work on 65 between Colo and Iowa Falls totaled 516,800 cubic yards.

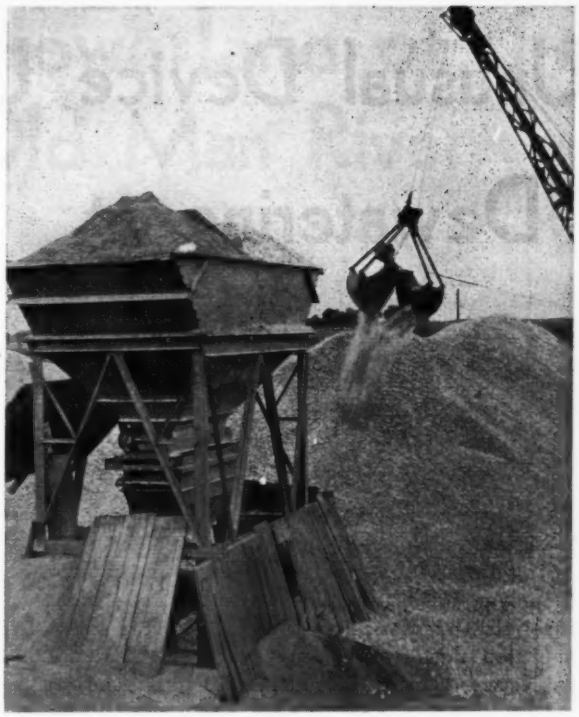
Three outfits were used, a grader outfit ahead of the paver, a Sargent dragline working south of Iowa Falls on the finishing and two Bucyrus-Erie 1030 draglines working north from Colo.

Two Bucyrus-Erie draglines and Ford trucks team up to make records on shoulder work

The work of the latter gang was particularly interesting. The draglines with ¾-yard buckets worked in the ditches on either side of the pavement loading to nine Ford dump trucks with Perfection bodies holding 1½ yards and hauling on the concrete.

The digging, consisting of common and light clay was easy going and the two draglines kept the trucks scurrying about on their short haul runs at top speed. Two dumps of the heaping ¾-yard buckets, though accurately placed by the operators, usually resulted in some spill at the loading point and in transit so that dirt piled up on the pavement to make the going plenty rough. This, however, did not seem to slow up the trucks and they bounced forward and back, turned around and swung under the draglines at full speed to stop short "on the spot." This ability for quick stops and starts and to maneuver at high speed in narrow quarters confirmed the good judgment of the contractor in selecting them for this type of work.

The new road has a 100-foot right-of-way and



Blaw-Knox bin and batcher used for loading trucks at Hubbard.

6-foot shoulders were built on each side of the 18-foot pavement giving a 30-foot road. Slopes on the shoulders were three to one and on the back slope one, and one-half, to one.

A Caterpillar Number 15 patrol grader leveled the shoulders to grade after the trucks had placed

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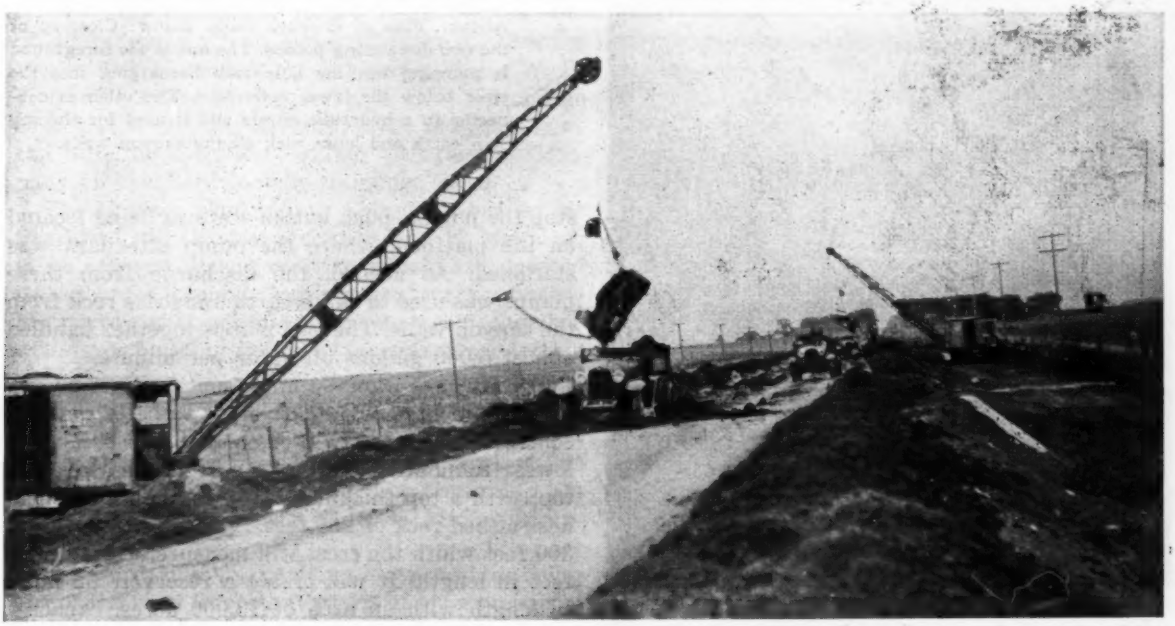
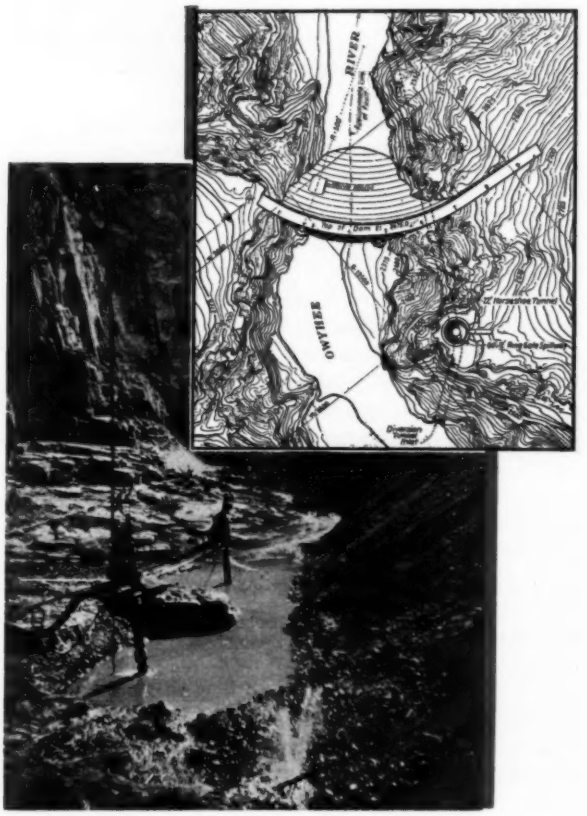


There was plenty of action on this J. A. Dunkle Construction Company job with two Bucyrus-Erie draglines, a fleet of Ford Trucks and the Caterpillar Grader on the jump all the time.

Unusual Device Used for Dewatering at Owyhee Dam

IN constructing the Owyhee Dam, General Construction Company of Seattle used an interesting device for removing water from the pools in the river bed after the river had been diverted through the diversion tunnel. General Electric-operated deep well pumps were suspended from cables stretched across the canyon, facilitating raising and lowering to meet water conditions encountered. Magnetic control was used to start and stop the pumps, push button stations being located on the platform where the pump attendant was stationed. As needed, the discharge from these pumps was used to sluice earth and loose rock from the canyon walls. The two pumps together handled almost 5,000 gallons of water per minute.



Above: Plan of Owyhee Dam. Below: Close-up of the two dewatering pumps. The one in the foreground is pumping out the hole and discharging into the river below the lower cofferdam. The other is connected to a hydraulic nozzle and is used for sluicing earth and loose rock off the canyon walls.

General view of the canyon at the Owyhee dam site. The black patch beside the dragline in the center of the picture is the water sump in which pumps are working.

The Owyhee Dam, 30 miles southwest of Nyssa, Oregon, on the Owyhee River, is to be of massive concrete arch gravity type, height 520 feet from lowest foundation to top, 317 feet from river to top, with a top thickness of 30 feet, bottom thickness at bed rock of 255 feet. Spanning a canyon of 300 feet width the crest will measure, over-all, 835 feet in length. It will create a reservoir 52 miles in length with an area of 13,000 acres, capacity, live storage 715,000 acre feet, dead storage 405,000

(Continued on Page 18)

Protecting the Flowerland of the South from Old Man River

The old levee at the left furnishes part of the material for the new levee at the right. Note how the ground surface is broken so as to obtain a good bond with the new embankment.

Grasser Contracting Company twenty percent ahead of schedules in building Teche Country levees northwest of New Orleans.

By Leigh News Service

"EVERY indication points to a very profitable completion of the work for the contractors." So states William T. Newton, Senior Superintendent serving under Major W. H. Holcombe, Chief of Engineers, U. S. A., in charge of 2nd New Orleans River District, in speaking of the work done by the Grasser Contracting Company on the Bordelonville-Hamburg levee.

The Grasser Contracting Company, headed by President and General Manager Paul E. Manning, is an old established concern which has devoted its resources to public improvement works consisting mainly of street and sewer contracts, together with levee building jobs. The large increase in this last class of work, due to the Government's flood control program, led the Grasser Contracting Company to devote most of its efforts in the past two years to levee building, in which work it has developed highly skilled operating crews and assembled the most modern of levee building equipment.

The Bordelonville-Hamburg levee, besides being one of the most important pieces of levee construction in Louisiana, has problems to tax all the experience of the builders' organization.

When the Federal Government decided to take over flood control, the problem of the Teche country was given serious consideration. This country contains some of the richest Louisiana parishes and is as well known in agricultural circles for the fertility of its land as in literature for its legends. One of the latter served Longfellow for his Evangeline. It is indeed "The Flower Garden of the South," yet has had invariably to stand the hardest blows which the rampant, flooding Mississippi could give!

New levee protects fertile Louisiana parishes famous in song and story

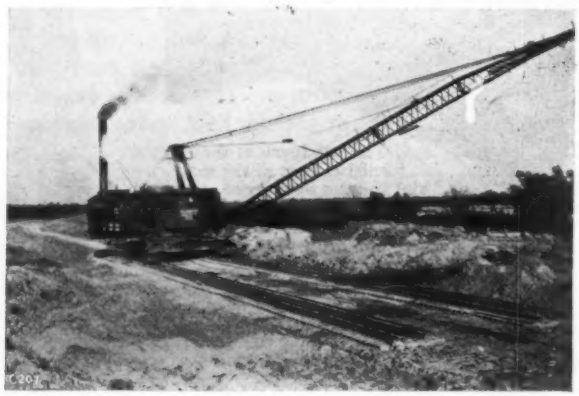
For the Teche country, though back from the Mississippi itself, is so situated topographically that it is particularly susceptible to flood fury. It is bordered by the meandering Bayou des Glaise, which empties into the Atchafalaya River, which in turn flows into the Atchafalaya Bay, thence to the Gulf of Mexico.

This Bayou, whose beauty is almost classical, has turned out to be the curse of the parishes through which it wanders. For, whenever the Mississippi rises, it flows into the Atchafalaya, which

backs into the Bayou, blocking the flow of water. Then if the river breaks through on Tensas Parish, the flood waters roll down, taking the Bayou as a natural outlet, and add a destruction bringing volume to the already high waters of Bayou des Glaise. Thus it can be seen that while the Mississippi is held in check by the levees guarding the back water near Teche country, the same Mississippi, by blocking the outlet of the Bayou des Glaise, and the Red River, by hurling its water through from the North, can create a flood behind its levees.

New levee replaces old State levees

The State of Louisiana, in an attempt to end these wasteful rampages of the Bayou, constructed, from taxes, an extra levee, which stood between the Bayou des Glaise and the Teche country, a supposed wall of protection.



The track sections on which this 6-yard dragline moves are well shown in this picture. Note also the operator's station high up where he can see all of his work.

But, when the swelling waters of the blocked Bayou were joined by the overflows from the North, the State protection levee crumbled beneath repeated attacks, despite the heroism of the natives, who struggled vainly to strengthen the embankment with load upon load of fertile soil.

When flood control received the attention of the United States, Federal engineers studied the old levee. As a result, a new and larger protective levee is being constructed almost upon the site of the old, and this is the work upon which the Grasser Contracting Company successfully bid.

Bucyrus-Erie six-yard dragline handles 150,000 cubic yards per month

The machine being used for this levee building is a Class 230 steam dragline excavator, constructed by Bucyrus-Erie Company, of South Milwaukee, to meet the special requirements of levee building, after consultation by its Engineers with William T. Newton, Senior Superintendent of the Second New Orleans District, U. S. Engineers, who has had many years of practical experience with this class of equipment.

The machine was sent down from South Milwaukee in thirteen cars and, as a track of the Louisiana and Arkansas Railway ran almost parallel with the beginning of the engineering task, the various parts were delivered practically on the job, and set up there by mechanics.

This Class 230 is a self-propelling levee builder with a weight of approximately 330 tons. Carrying a boom 150 feet in length, it handles a drag bucket with a capacity of six cubic yards. It travels on a sectional track (each section fifteen feet long by 10 feet wide) running on 100-pound rails mounted on top of twelve by fourteen-inch by fifteen-foot pine stringers, which in turn are mounted on ten by ten-inch by ten-foot ties placed transversely under the stringers. The machine moves and places these sections as required, traveling thereon from 100 to 500 feet per day, according to the nature of the work, averaging an output of 150,000 cubic yards of pay dirt per month under favorable conditions. This carries with it additional earth to allow for shrinkage, making an average gross output of about 187,500 cubic yards per month.

Federal specifications require a forty-foot berm on all levees. The borrow pit may begin at a depth of three feet and slope two to one; afterward it may slope from one to ten to such extent as is necessary to provide additional dirt.

In about half of the work, the job consists of tearing down the old line levee and throwing it over to form a new and larger line, the parts of the old levee being used as dirt for the new one, in addition to such extra dirt as is required, which is taken from a borrow pit.

Short cut saves over 30 miles of levee

Government engineers, in surveying their work, found in the old levee, between the towns of Bordelonville and Hamburg, a large bend which necessitated 35 miles of useless levee. The distance between these towns, in a straight line is only 4 miles. So the protected waste land which lay in the circle of the old levee, consisting mostly of virgin forest, was bought and plans call for the building of a levee on an almost straight line between Bordelonville and Hamburg.

Tough going through swamps and virgin forest on new section

Up to the time this section was reached the work of the Grasser Contracting Company had been fairly simple. The old levee was situated in such close proximity to the new one, that the levee building machines were operating in cleared country with easy digging from open borrow pits.

When the four miles of short cut which the government designed between Hamburg and Bordelonville were reached, however, the contracting firm met with new problems. Here their levee path led

through virgin forest so thick that, in spots, the sun could not reach the earth. It is a territory which has known many inundations and which is traversed by bayous, to say nothing of slight hills. Soft, sticky mud — blue clay — water —buck shot! About the only break for the Grasser Contracting Company was that they worked this stretch after a drought. U. S. Engineers who surveyed the ground for the Government, labored in water up to their waists most of the time.

To get the giant levee builder through was a problem. A road had to be cut through the forest. Trees were chopped, then stumps blasted out. Thick logs, sawed up, were laid on water-soaked mud to form a base for the machine to operate on. Small bayous which twisted through the tangle of forest had to be filled in, then dug out again, so as not to interfere with drainage.

Buckshot — the nightmare of the levee builder

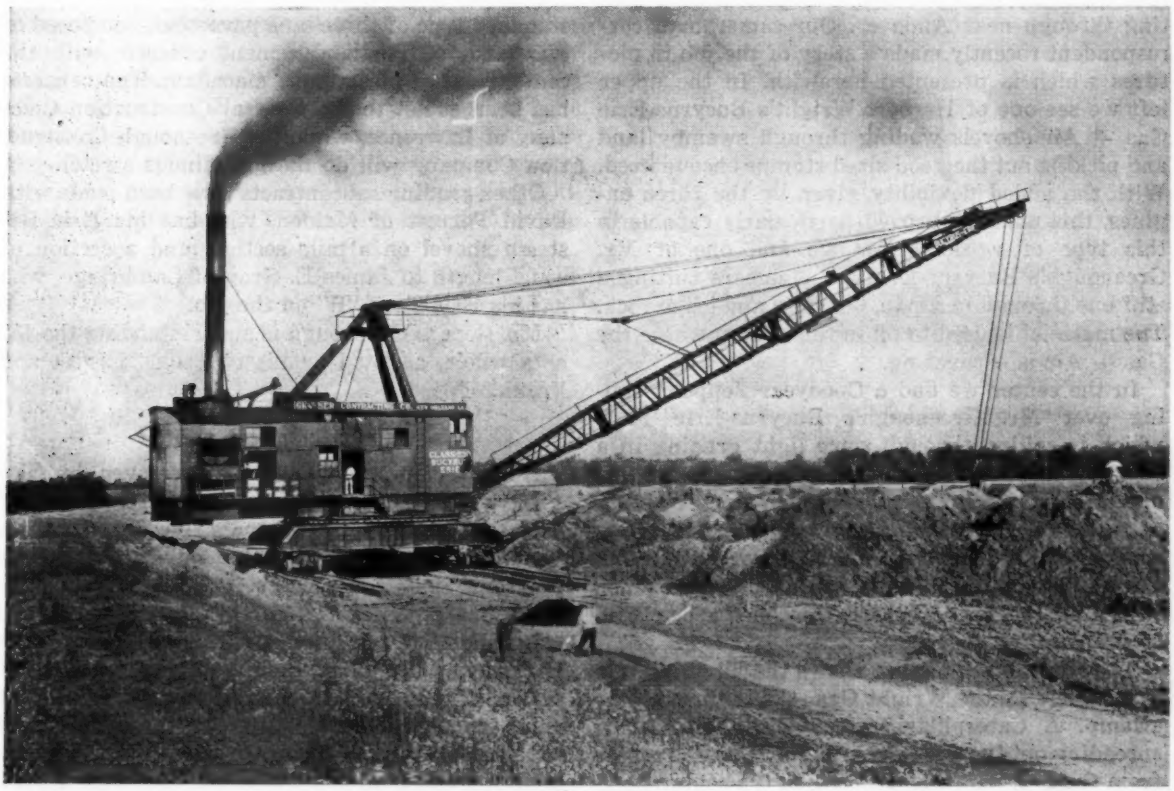
The bottoms of small lakes, dried through the drought, had to be crossed. Soft ground, sticky blue clay, and that nightmare, buckshot! This last is the remains of volcanic material which washed down into Louisiana from the North Dakota Bad Lands at times when the Missouri River ran amuck. Containing no vegetable matter, when dry it is hard — and spongy. In damp atmosphere it absorbs water like a sponge, softening into a sticky, clinging mass. The only way it can be freed of water is by pressure. When dug out and placed in the sun, for days the water still remains in its core.

It offers absolutely no foundation, slips and slides under pressure, clings obstinately to anything it comes in contact with. When placed in a pile, it has a tendency to slide apart, each piece leaving a lubricated path over which the next one can follow.

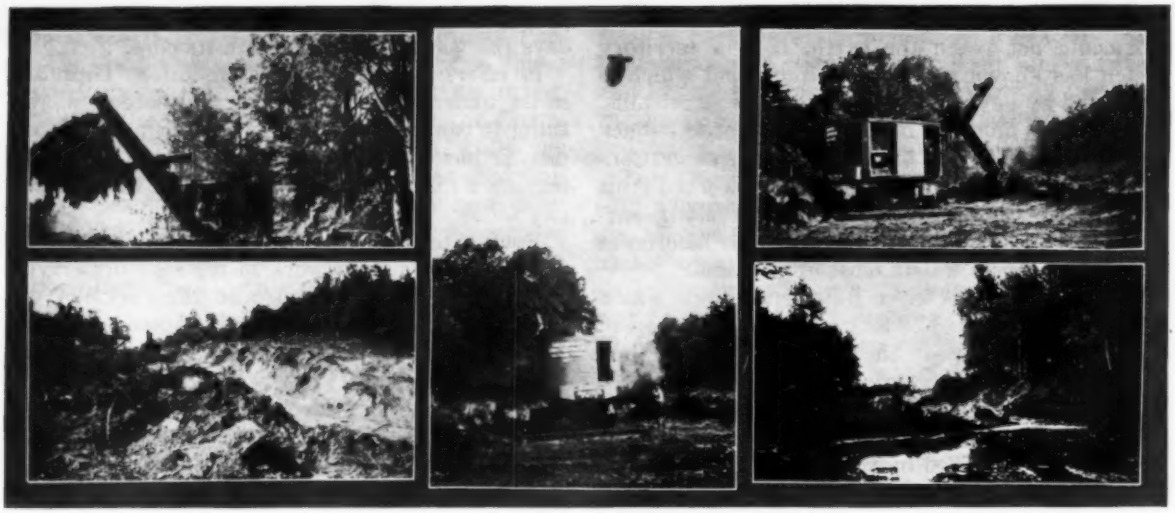
Fortunately for the Grasser organization, the drought preceded its work in the section carrying the bulk of this material, also the buckshot was mixed with a certain amount of sand or loam, which eliminated some of its sliding qualities. But even so, the going was treacherous and slow in this difficult part of the work.

Yet with all this, Grasser Contracting Company is about twenty per cent ahead of its time schedule and is sixty per cent through with the job. The efficient planning and organizing by the executives of the Grasser Contracting Company and the successful performance of the giant levee builder are partly responsible for the very creditable showing — the work of the engineers in circumventing the swamp problems, and the labor of crew cutting through the swamps deserve credit for the rest.

And when this is through, Teche country will have a real protection against the ravaging waters of the Mississippi and Bayou des Glaizes, which always threaten and frequently have destroyed the crops which are its prosperity.



This Bucyrus-Erie Class 230 dragline is throwing up 187,500 cubic yards of dirt per month in the new levee along the Bayou des Glaise.



Greenough Construction Company Grades Massachusetts Highway

STUMPS, swamps, hardpan, boulders and ledge rock make things interesting on the job of highway building the Greenough Construction Company of Waltham, Massachusetts, is putting through near Andover. Our cameraman correspondent recently made a story of the job in pictures which is presented herewith. In the upper left we see one of Herbert Wright's Bucyrus-Erie Gas + Air shovels wading through swampy land and picking out the good-sized stumps encountered. With the added flexibility given by the three engines, this machine proved particularly capable in this type of work. Below we find one of Mr. Greenough's Bucyrus-Erie B-2 steamers cutting a stiff one through hardpan, boulders and ledge rock. The material is used to fill in the swamp where the Gas + Air is excavating.

In the center we find a Goodyear Zeppelin sailing over Mr. Greenough's Bucyrus-Erie 1035, which is sailing through some light grading in a swampy section. This and the second view of this operation at the upper right illustrates the ability of the 1035 to cut accurately to grade. The going was quite soft, and so the machine worked through this section on mats. They will hardly need finish stakes on the grade behind this one-yard, chain-crowd gasoline shovel.

The right lower picture shows the fill going into the cut left by the Wright Gas + Air through the swamp. A Caterpillar tractor with bulldozer is spreading out the material brought in by the trucks from the B-2, which is working in the center background.

The road is to be graded this year, which means the moving of about 300,000 yards of material before closing down for the winter.

The pavement is to be of the new Massachusetts standard type of three-lane pavement, composed of two lanes of Portland cement concrete with the center lane of bituminous macadam. The concrete has been sublet to the Central Construction Company of Lawrence, while the Greenough Construction Company will do the bituminous stretch.

Other grading subcontracts have been made with David Perrott of Malden, who has his Erie B-2 steam shovel on a mile section, and a section of equal length to James E. Gray of Cambridge, who has his Erie Type "B" on the job.

Mr. George Greenough is superintending the job as a whole, assisted by his two sons, Ernest and Frank.

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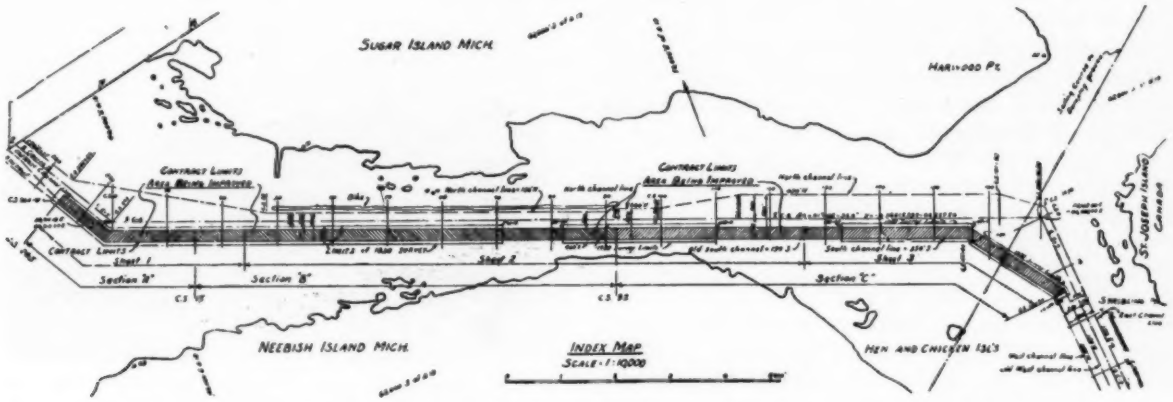
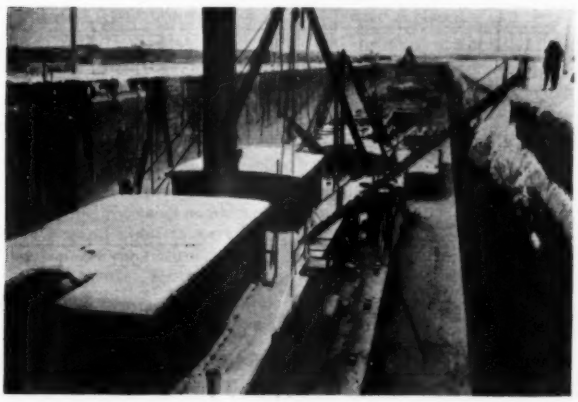
New Channel in St. Mary's River Cuts Time to Lake Superior Ports

Standard Dredging Company and sub-contractors excavate 2,000,000 yards for 3½ mile short-cut channel 200 feet wide and 22 feet deep.



The above map shows the magnitude of the work, the location, length and widths of the channel.

ON THE ST. MARY'S RIVER about 10 miles below the locks of the St. Mary's Falls Canal the Standard Dredging Company of New York, Galveston, Oakland, Los Angeles, Tampico, Mexico City, and Sault Ste. Marie are excavating a 3½ mile channel widening between Sugar Island and Neebish Island which saves time and mileage for up-going boats headed for Lake Superior ports. The work adjoins the southerly edge of the present 300-foot wide upbound or Middle Neebish Channel. The locality is shown on the United States Lake Survey Chart No. 62, being Chart No. 2, St. Mary's River. Excavation of an estimated yardage of 1,630,700 yards of rock, hard pan, sand, clay, gravel and boulders is required. 694,000 yards of this is ledge rock, 215,300 yards hard pan, 521,400 yards sand, gravel and boulders. As the work has progressed quantities have overrun considerably and probably will total around 2,000,000 yards when the work is completed.



Fleet of dredges in Soo locks for winter repairs during winter of 1929-30.

The Gladiator, Bucyrus-Erie steam dipper dredge, used by the M. Sullivan Dredging Company of Detroit on their section of the excavation.

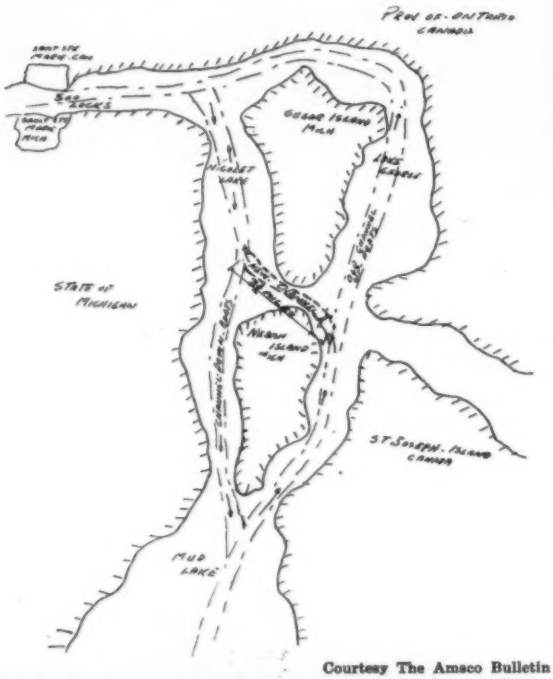
Work Completed on Scheduled Time

All of the drilling and blasting was completed early this spring two months ahead of schedule. As this article is being written, early in September, all of the dredging is being completed on scheduled time.

The United Dredging Company which is a subsidiary company of the Standard Dredging Com-

pany of New York are the contractors. A subcontract for a portion of the dredging only was let to the M. Sullivan Dredging Company of Detroit and the dipper dredges, Hercules and Gladiator were put on this section. This work was finished the latter part of August. Another section was sublet to the Duluth Superior Dredging Company of Duluth and the dipper dredge Old Hickory and the hydraulic dredge Niagara were placed on this section. This section was finished early in the month of July and has been cleaned up and accepted by the government.

All of the drilling and blasting was done by the Standard Dredging Company and the bulk of the rock dredging was done by the Standard Dredging Company's Dredge No. 18.



Courtesy The Amsco Bulletin

Sketch showing location of the new channel between Sugar and Neebish Islands and the round-about old channel for upbound boats which this will eliminate

Six tugs for towing were engaged in this work, the tugs Peoria and C. D. Thompson of the Standard Dredging Company, the tugs Denby and Columbia of the M. Sullivan Dredging Company and the tugs Gladiator and Scott of the Duluth Superior Dredging Company.

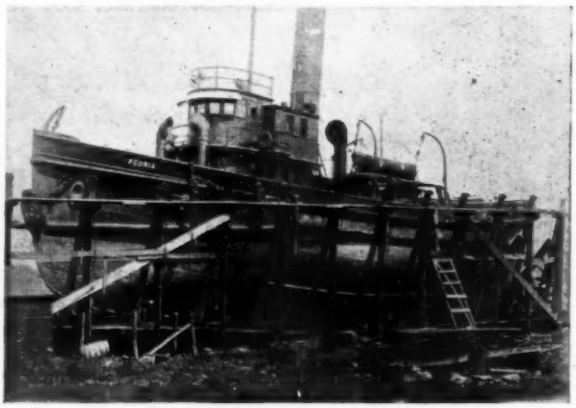
New Type of Equipment Successfully Used

A new submarine rock drill was used on this rock work which was patented by W. D. Grant, of the Standard Dredging Company. This is a Mogul type of drill which drills a 6-inch hole and uses large cartridges for blasting.

A new type of drill boat was also used which had never been used on the Great Lakes before and the drilling was finished ahead of scheduled time. Very little re-drilling had to be done — less than on any job on record. No trouble was encountered while drilling the rock.

All Dredges Built by Bucyrus-Erie Company

All of the dredges that were used on this work were built by the Bucyrus-Erie Company. All of the dredges were equipped with Missabe-American Manganese Steel rock buckets. Explosives for the job were furnished by the E. I. du Pont de Nemours



Ocean-going tug Peoria in dry dock.

and Company of Wilmington, Delaware.

The work was in charge of Guy W. Sackett, Sault Manager for the Standard Dredging Company with Russell M. Clifford as assistant and Bob Conroy, captain of Dredge 18.

An Idea?

First Sparrow: "See that nice new hat down there?"

Second: "Well, what of it?"

First: "Well, I was just wondering."

Unusual Device

(Continued from Page 12)

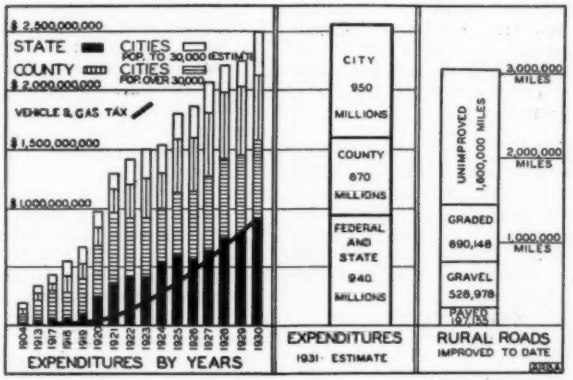
Upstream elevation of dam which will store water for irrigating 125,000 acres of land.

acre feet. It will contain 540,000 cubic yards of concrete, and required 300,000 cubic yards of excavation for dam, spillway, etc. In addition about 800,000 cubic yards of pit-run gravel is to be excavated for aggregate. It will irrigate 125,000 acres and is to be completed in 1933.

Bucyrus-Erie and Marion draglines are being used for the excavation.

Excavation for 1931 Highway Construction

THOMAS H. MACDONALD, Chief of the Bureau of Public Roads, has estimated that three out of every four dollars expended on public highways goes to labor. For each man working on the road three others are employed, part time at least, in supplying him with equipment and raw materials. It is also estimated that some 75,000 more men were directly employed in road construction in 1930 than in 1929. This brings the total gain in employment including the men who manufactured equipment and supplies to some 250,000 men. The men who worked directly on the roads totaled 300,000 in 1930 and the indirect labor probably comes close to the million mark.



The above chart issued by the American Road Builders' Association shows a summary of highway construction expenditure by years with their forecast for 1931.

It is estimated that there are 3,000,000 miles of roads in the United States of which only 197,155 miles are paved and 528,978 miles graveled. Automobiles have increased 40% in the last five years; roadbuilding 13%.

Considering these two groups of facts we can readily appreciate why National, State and Local Governments are putting forth special efforts to enlarge road building programs to take up the slack in employment caused by present industrial reorganization.

The American Road Builders' Association estimates the state highway and bridge expenditures during 1930 at $629,000,000, exclusive of maintenance. In addition they place the figure for municipal and county expenditures for the same purposes at $1,612,000,000 or a grand total of $2,241,000,000. For 1931 this organization forecasts an expenditure of $2,560,000,000.

Below, *The Excavating Engineer* gives you, through the co-operation of the State and Provincial Highway Departments of the United States and Canada a brief outline showing estimates of excavation for highway construction contemplated for the coming year in the various States and Provinces. It must be understood, of course, that figures given are advance estimates and, therefore, are only approximate. The estimates given are carefully prepared for us (except as noted) and confidence may be placed in the accuracy of the reports so far as estimates can be considered accurate under the circumstances. It is obviously impossible, in most cases, to include in these estimates any reasonably accurate forecast of county, municipal and local road work.

It is probably safe to forecast that these estimated programs are, as a whole, under rather than over the actual work which will be done. The efforts of President Hoover and the various State Administrations to stabilize business conditions by releasing increased public work during the coming year will probably have a marked effect in enlarging highway programs.

Alabama

The Legislature meets in January, at which time the new Alabama highway program will be adopted. All funds from the second bond issue are obligated by past or present activities so no definite plans can be made before the Legislature meets. However, it is quite certain that the 1931 program will at least equal that of 1930. In addition about 3,000,000 cubic yards of excavation costing $824,000 will be carried over into 1931 on the year's uncompleted contracts.

Arizona

The budget for the Arizona Highway Department is made up as of July 1, including the succeeding fiscal year; and the Department does not break work on the calendar year. After the budget is completed, it is impossible to change it without the legislative action.

The work under this fiscal year's budget in the amount of $6,500,000 is now about 75% completed as to construction work, and practically all of the work under the budget will be completed as of June 30, 1931.

Due to the recent emergency Congressional appropriation for Federal Aid work, and with the unquestionable State Legislation of the incoming Legislature in this State providing additional highway funds, and the program for this fiscal year, or at least the calendar year of 1931, it is totally impossible to anticipate at this time what the program will entail.

Without legislative action, this State will not be able to take full advantage of the Federal emergency appropriation and the next fiscal year's budget would not exceed five million, or a reduction of one and one-half million in the succeeding budget. If the State Legislature does provide additional funds, which will enable the State to take full advantage of the Federal appropriations, the work in the next fiscal year should be approximately seven million dollars. This is including construction, maintenance, and all operation expenses of the Department. Of that amount, approximately five million dollars would be for construction.

Arkansas

The Arkansas contemplated highway program for the calendar year 1931 will probably incorporate about 200 miles of grading work involving the moving and placing of approximately two million yards of earthwork, paving of approximately 150 miles with Portland Cement Concrete or high type of asphaltic paving and about 250 miles of Bituminous treatment work consisting mostly of retread or surface mixture. The bridge program will involve a probable expenditure of three million dollars. This program is tentative and is dependent on the action of the 1931 Legislature, which convenes in January.

California

The State Legislature will be in session during the coming winter, at which time appropriations will be made for the ensuing biennium. Until the budget is approved, the State Department of Public Works will be unable to plan a construction program. The amount of work placed under way since January 1, 1930, and scheduled for advertising before December 31st, includes the following:

Portland cement concrete pavement	89	miles
Asphalt concrete pavement and surface	58	"
Bituminous macadam pavement	57.5	"
Oil treated crushed gravel or stone (includes grading)	223	"
Untreated crushed gravel or stone surface (includes grading)	86	"
Grading only	59.5	"
Total	573	miles

Sand, gravel, crushed stone, cement and natural asphalt will be required in large quantities to meet the requirements of the 1931 highway programs. Here we see the way Service Rock & Gravel Company loads the material from their gravel pit near Riverside, California. A Bucyrus-Erie 1030 loads to the movable conveyor outfit which carries it to the portable screening plant and loading pit. A side conveyor spoils the waste and the cleaned product is loaded to Plymouth drawn Western cars.

Colorado

The American Road Builders' Association estimates Colorado will spend $5,000,000 on state highways for construction and maintenance.

Connecticut

The Highway Department does not and cannot anticipate their building program for 1931-1932 until after the next session of the Legislature when their budget comes up for approval. The American Road Builders' Association estimates $12,600,000 expenditure for Connecticut State highways in 1931. It is estimated that $10,100,000 of this will be for construction, $2,500,000 for maintenance.

Expenditures of the Connecticut Highway Department for the present fiscal year amount to $14,577,747. Among the larger items were:

General Maintenance on Trunk Line Highways, $2,271,590, which included the ordinary maintenance, oiling, skim surfacing and things of that character; Trunk Line Road Construction other than Federal Aid, $2,217,488; Trunk Line Reconstruction, other than Federal Aid, $2,020,718; State Aid Road Construction, $2,593,909; Trunk Line Highway Construction, Federal Aid, $240,933; Trunk Line Reconstruction, Federal Aid, $395,217; Trunk Line Bridges, other than Federal Aid, $571,510; Trunk Line Bridges, Federal Aid, $293,804; and Elimination of Dangerous Conditions on Trunk Line Highways, $130,899.

The Highway Department is still working on computation of the mileage for the same period and is not able at this time to release any data.

Delaware

Grading about 45 miles of new roads at an expenditure of approximately $300,000 and reconstruction of 15 miles at a cost of about $200,000 are part of the present 1931 road program planned by Delaware's Highway Department. Thirty-five miles of the new roads to be built will be Federal Aid and will require $280,000 expenditure, while 10 miles of State Road will cost $20,000. The reconstruction will be entirely on Federal Aid Highways. It is expected the new roads building will involve some 300,000 cubic yards of excavation, about 30% of which will be shovel work. In addition, 130,000 cubic yards of excavation costing $50,000 will be carried over on old contracts. It is estimated that 55 miles of Delaware highway will be paved in 1931 at a cost of $1,300,000 and that 10 miles will be surfaced with gravel or crushed stone at a cost of $100,000. This program as it stands will probably involve about the same expenditure as that of 1930.

Florida

The American Road Builders' Association estimates Florida will spend $12,000,000 on state highways for construction and maintenance.

Georgia

The 1931 highway program for Georgia has not yet been prepared. However, it is expected that there will be available for highway construction approximately $14,000,000.

Idaho

The American Road Builders' Association estimates Idaho will spend $5,500,000 on state highways for construction and maintenance. The Legislature will have up for consideration a $10,000,000 bond issue which, if passed, will probably not be available until 1932. Legislature action for 1931 in connection with a redistribution of revenues and drivers' license fees.

Illinois

Back in 1924, Illinois set a year's construction record of 1,113.5 miles of concrete, which still stands. To November 1 of 1930, Illinois awarded contracts for the building of the equivalent of 1,044 miles of 18-foot pavement, and will complete 830 miles this year. The differential is explained by the fact that contracts for lengthy mileages to be built next year have been awarded this fall so that work can start immediately in the spring.

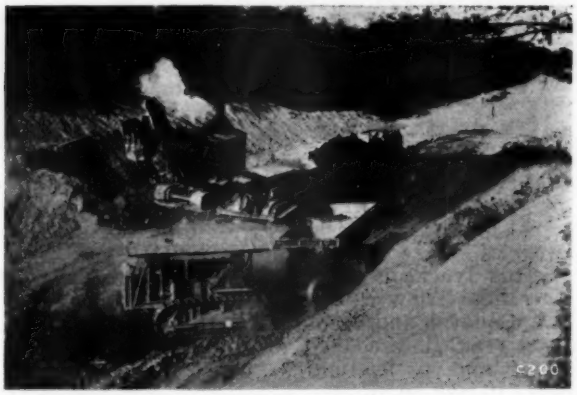
The American Road Builders' Association estimates expenditure on state highways by Illinois in 1931 of $29,000,000 for construction and $2,600,000 for maintenance.

Indiana

The plans of the Indiana Highway Commission provide for the paving and surfacing of approximately 450 miles of roads during the 1931 construction season.

The plans also include the construction of a large new bridge over the Ohio River between Henderson, Kentucky, and Evansville, Indiana, at a cost of approximately $2,500,000 and the construction of two more interstate bridges across the Wabash River at Mt. Carmel, Illinois, and at Vincennes, Indiana, at an estimated cost of approximately $1,250,000, one-half of which will be paid by the State of Illinois.

Also included is the construction of 30 miles of 40-foot pavement on which is locally known as the Dunes Relief



Caterpillar tractors, Creeper wheel-mounted Beihl wagons, and Bucyrus-Erie 42-B steam shovel were used by Campbell & Sons of Townson, Maryland on this job of straightening Washington Boulevard.

Road between Gary and the Michigan State line at which point the Michigan Department takes up the project and continues it to the north along the east shore of Lake Michigan. The cost of this improvement in Indiana, including railroad and highway grade separations will be approximately $2,000,000. The first half of this project is already under contract and bids for the remainder were received on November 21st.

The total estimated amount of revenue of the Indiana Department during the fiscal year is approximately $24,000,000, although that can not be assured until after the Legislature meets in the coming January and February.

Iowa

The American Road Builders' Association estimates Iowa will spend $30,000,000 on state highways for construction and maintenance.

Kansas

Next year's program will depend entirely on the action of the 1931 Legislature which convenes in January, inasmuch as the Kansas existing gas tax law runs out on June 30th, 1931. It at least will not be possible to make any particular forecast on next year's activities before the first of March.

From October 1, 1929, to September 30, 1930, Kansas built 348 miles of Federal Aid highway at a cost of $4,483,586 to which may be added $1,203,519 for bridges. Add to this 1,270 miles of State road construction and 887 miles of resurfacing costing in all $5,316,303 and you have construction and improvements to 2,505 miles of Kansas highways at a total cost of $11,003,409.

Kentucky

The Kentucky highway and bridge program increases from the $12,875,000 expenditure of 1930, to $30,463,000 for 1931.

Revenues for the State Highway Commission are made available by two-year periods beginning April 1st of each even year. For the biennial period from April 1st, 1930, to April 1st, 1932. Kentucky highway funds total $43,338,000, including $8,000,000 in bridge bonds, $16,640,000 from the 5-cent gasoline tax, $5,900,000 from motor licenses, and $4,713,000 Federal Aid.

From April 1st to December 1st, 1930, expenditures chargeable to this fund total $12,875,000, including $8,297,000 for construction, $2,596,000 for maintenance and $771,000 for equipment.

The program for the remainder of the biennial period—from December 1, 1930, to April 1, 1932, totaling $30,463,000, includes $13,393,000 for highway construction, $5,500,000 for maintenance, $800,000 for equipment, and $8,000,000 for toll bridges. The latter item represents a bond issue for bridges over the Kentucky, Cumberland, Tennessee, Green, and Ohio Rivers to be operated as toll bridges until the investment has been repaid and then made free bridges.

The construction of several other bridges is contemplated, using this same method of financing. Advertisement for letting of approaches to these bridges is set for January 14th and February 18th, the estimated cost of grading, draining and surfacing these approaches being $500,000.

Louisiana

The American Road Builders' Association estimates Louisiana will spend $30,000,000 on state highways for construction and maintenance.

Maine

The 1931 Maine highway program tentatively includes approximately 575 miles of reconstruction at a cost of about $7,649,600. Of this 33 miles represents paving at a cost of $1,291,800 and 542 miles gravel or crushed stone surfacing at a cost of $6,357,800. Only 71 miles of the work is on Federal Aid roads and expenditure on this portion will approximate $2,368,500. It is estimated that the 1931 work will involve 1,883,300 cubic yards of excavation, about 60% of which will probably be shovel work.

Maryland

A telegraphic report from the Maryland State Road Commission forecasts a 1931 program of grading 290 miles, involving about 1,500,000 cubic yards of excavation, about 60% of which will be shovel work. Reconstruction is expected to require 100,000 cubic yards of additional excavation. Two hundred thirty miles of paving and 60 miles of graveling are tentatively planned.

Massachusetts

The Department of Public Works of the Commonwealth of Massachusetts is unable at this time to estimate the excavation for their 1931 program. During the fiscal year of 1930, contracts were awarded covering 220 miles of hard-surface roads and about 75 miles of gravel roads at an estimated cost of about $15,000,000. It is anticipated that about the same mileage will be contracted in 1931.

Michigan

The American Road Builders' Association estimates Michigan will spend $30,000,000 on state highways for construction and maintenance.

Minnesota

S. J. Grove on a Minnesota State Highway contract near Tamarack used Caterpillar Sixties and Athey Three-Way Dumps in building this fill.

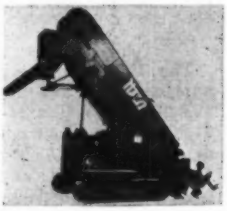
The preliminary program for Minnesota's construction next year provides for the following:

	Mileage	Ave. Cost per Mile	Estimated Cost
Paving	248	$25,000	$6,200,000
Grading	311	12,000	3,732,000
Gravel Surfacing	350	2,400	840,000
Bituminous Treatment	300	1,700	510,000
Total	1209		$11,282,000

(Continued on Page 42)

EQUIPMENT YOU OUGHT TO KNOW ABOUT

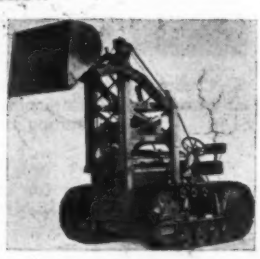
Haiss Exhibits Excavator and Bucket



IN THE Road Show Arena at AR-9, *George Haiss Manufacturing Co., Inc., 141st to 144th Streets on Canal Place, New York,* will exhibit the Haiss Excavator and Haiss Clamshell Bucket with moving pictures showing field operation. The manufacturers claim a capacity of 2 cubic yards per minute for the improved excavator, which is recommended by them for road and street grading as well as subway grading. Among improvements in the 1931 model are longer caterpillar-type mountings — now 9 feet over-all; 6-cylinder 60-horsepower Waukesha motor; heavier gears, clutches, etc., bucket clean-out device automatically clearing buckets of clay and sticky material.

The 1931 model of the Haiss "Hi-Power" Bucket has sheaves equipped with Hyatt roller bearings, protected by means of rings and grease seals. All sheaves as well as other wearing parts are equipped with Alemite lubrication. The teeth have been redesigned to give more effective digging ability by changing the angle of the teeth with reference to the slope of the jaw. The jaws have been increased in size and the brackets are of the cantilever type. The bottom sheave block has been redesigned and is now made entirely of steel. The sheaves are held by the upper bracket of this block so as to keep them out of the dirt and make it easier to reeve the cable. On the ½ and ¾-yard size buckets, are furnished five sheaves, two at the head and three at the bottom. On the 1-yard size and up, three sheaves are furnished at the head and four at the bottom, giving a closing ratio of 1-to-7.

New Trackson Crawler, Shovel and Hoist at Road Show



THE new Trackson Model GH Crawler will be a feature of the Trackson exhibit at the 1930 Road Show. This new heavy-duty crawler has plenty of power and traction to meet the requirements of drawbar work, and at the same time has the open design and wide clearances necessary for easy installation of graders, hoists, shovels, backfillers, and other auxiliary equipment. Four forward speeds and a reduction gear drive, wide-spread tracks having 1,750 square inches of ground contact, heavier parts, Timken bearings, claimed. Front sprocket axles, variable in height, rigid frame construction, etc., are some advantages make it possible to change the ground contact at the front of these crawlers for different kinds of work.

This Trackson Crawler will also be displayed at the Road Show equipped with the new Trackson High Shovel, another important development of the past year. Both a digging and a loading unit, it may be mounted either on a wheel tractor or on the Trackson Crawler unit. This shovel digs, moves, and loads materials in one continuous operation and with only one man.

Trackson Crawler Wheels, designed for mounting on wagons and trailers of various makes, will be displayed at the Road Show, in the 6-ton, 10-ton and 15-ton sizes. These wheels are built of heavy alloy steel castings and drop forgings to provide a big margin of safety over the rated load capacities of wheels. A feature of Trackson Crawler Wheels is the take-up device, which provides for tightening the track shoe loop by varying the wheel centers to suit different operating conditions.

The Model LH Trackson, a lighter and faster crawler than the heavy-duty Model GH, will be displayed at the show equipped with the Trackson Hoist. This hoist has a wide range of usefulness. It may readily be converted from a single to a double drum hoist, or vice versa. The auxiliary drum may be installed directly over the main drum whenever the user needs it, without any alterations. The level wind, an exclusive Trackson feature, wraps the cable on the drum evenly and smoothly, entirely eliminating the inconvenience and delay caused by having to unwind, straighten out, and re-wind the line.

The Trackson exhibit will be located in Booth A-28 at the Road Show. Write the *Trackson Company, 1320 So. First St., Milwaukee, Wisconsin,* for bulletins if you are interested and cannot see their equipment at the St. Louis display.

Testing Machines Featured in Leschen Road Show Space

A. LESCHEN *& Sons Rope Company, 5909 Kennerly Avenue, St. Louis,* will exhibit at the Road Show in St. Louis in Space A-32-a. Their exhibit will consist primarily of samples of wire rope. On display will be a sample of every rope recommended for use on all types of roadbuilding equipment. Testing machines will demonstrate some of the tests made on every wire before it is put into any Leschen rope. Information on Leschen "Hercules" wire rope may be obtained by addressing the manufacturer at the above address.

Wisconsin Road Show Exhibit

THE *Wisconsin Motor Company of Milwaukee, Wisconsin,* intend to exhibit one of their large industrial engines, the Model D-2 — 5¼ x 6½ — 6-cylinder, and two of their small air-cooled engines, the A-1½ and A-5, at the Road Show in St. Louis.

The air-cooled engines are new products, and one of them is illustrated herewith. The air-cooled series is being built in 1½ to 5-horsepower.

Catalogues will be gladly furnished to those writing the above and mentioning *The Excavating Engineer.*

With Blaw-Knox at the Road Show

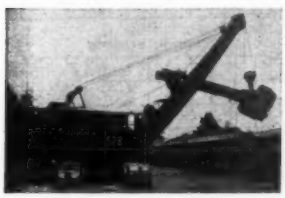
BLAW-KNOX equipment exhibited at the 1931 Road Show in St. Louis will include: Portable Bulk Cement Plant for road contractors of 110-barrel capacity, equipped with 1,000-pound Cement Batcher; The Cementank, a new development for the transportation of bulk cement that fits into the batch compartments on trucks; the seven-yard Wagon Grader equipped with crawler tracks for fast operation; a development in dirt digging and moving equipment that digs, hauls, transports, dumps and spreads dirt and can also be used as a bulldozer; the new 8-inch base Road Form as well as the complete line of 6-inch base Road Forms; Weighing Batchers for weighing three types of aggregates to be used where the coarse aggregate is divided into two sizes; the Agitator Truck Body (mounted on a motor truck) equipped with revolving blades geared to the truck transmission, to keep the concrete in constant agitation during transit; the Ord Finishing machine shown in operation on Blaw-Knox Road Forms and demonstrating the advantages of the double-screed finishing principles; fifty-one-ton Weighing Batcher-plant equipped with Double Weighing Batcher; popular types of Clamshell Buckets and Dragline Buckets; and Street and Sidewalk Forms in a complete assortment of various types and sizes.

Information on any of these products may be obtained by writing *Blaw-Knox Company at Pittsburgh, Pennsylvania,* and referring to this article.

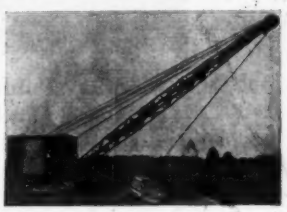
Bucyrus-Erie 1930 Accomplishments

BUCYRUS-ERIE *Company of South Milwaukee, Wisconsin,* points out the following new products offered during 1930 to the excavating industry.

2½-yard Diesel. This new product, the 52-B, is said to combine high speed of operation and the economy of Diesel fuel with several features new on this size of machine. These features include a slow-speed, six-cylinder Diesel engine, arrangement for shipping on flat car without dismantling, independent swing and propel, oversize caterpillar mounting for dragline work; steering from the operator's position, all high-speed shafts mounted on ball or roller bearings.



1-yard gasoline clamshell. The 1035 gasoline clamshell, convertible to shovel, dragline or crane, is a machine combining such modern features as the mounting of all continuously running shafts on ball bearings and completely inclosed engine transmission, with such unique features as the new swing and propel reversing unit. This unit with all shafts mounted on bearings, is mounted in one single heavy casting and completely inclosed.



New ⅝-yard shovel, crane, clamshell and dragline. The 1025 includes all the modern features found in the 1035 mentioned above.

1¼-yard steam shovel. This new machine, the 42-B, combines strength for the heaviest kind of digging with the speed of a much smaller machine.

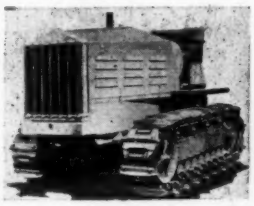
5-yard full-revolving quarry shovel. The 170-B brings to the quarry and mine operator the output capacity of the 5-yard shovel, coupled with all the rugged strength of the old railroad shovel and the many advantages of the full revolving shovel. It is a larger companion to the famous 120-B shovel, known to quarry and mine operators the world over as the machine that replaced the railroad shovel.

200-ton railway crane, which finds its principal use among railroads, lifts a maximum load of 200 tons at a 17½-foot radius. Its most interesting features are low center of gravity, permitting high speed transportation, very strong construction, an unusual degree of accessibility and great clearance for lifting bulky objects.

"To stand still is to go backwards." This is more true today in the present period of business inactivity than it is at times when business is progressing at a faster rate. In these days of an ever-increasing use of machinery, "normal progress" is no progress. Accordingly, Bucyrus-Erie Company is proud of these additions to the most complete line of excavating machinery in the world.

Cletrac to Show Complete Line at St. Louis

CLETRAC display at the Road Show will be conducted in the Exhibition Hall, in adjoining spaces 24 and 44.



It will consist of the complete line of Cletrac Crawler Tractors, composed of Models 15, 20, 40-30, 40 and 80-60 (illustrated) Cletracs. A larger space has been contracted for and the Cletrac exhibit is expected to be bigger, more elaborate and of greater interest than any ever conducted at a previous Show.

The entire list of officials and department heads at the factory will attend, as well as the entire force of field salesmen for the whole United States.

If interested, but unable to see the exhibit, use one of the post cards from the center of the book to write *The Cleveland Tractor Company at Cleveland, Ohio,* for descriptive literature.

(Continued on Page 26)

THE EXCAVATING ENGINEER

A Monthly Publication Devoted to Excavating and Allied Subjects

REGULAR SUBSCRIPTION: $1.00 a year for 12 months.
SPECIAL SUBSCRIPTION: Upon application on card inserted in this number, The Excavating Engineer will be sent frequently (not regularly) free of charge. Only for those engaged in the industry of excavation.

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The Business Situation

DURING recent months we have pointed out several times that pessimism is always prevalent during the last stages of a major depression. One of the best comments on this fact we find in the National City Bank of New York's Business Letter for December. "At this stage of every depression we have to recognize that the visibility is bound to be low, and draw inspiration from a common-sense realization of the underlying resources and strong recuperative powers of the country, as demonstrated over and over again in the past, rather than from any tangible signs of improvement."

Visibility *is* low and, in case some of us are inclined to feel that there is little reason for low visibility, let us recall that visibility was also quite low back during the Summer of 1929.

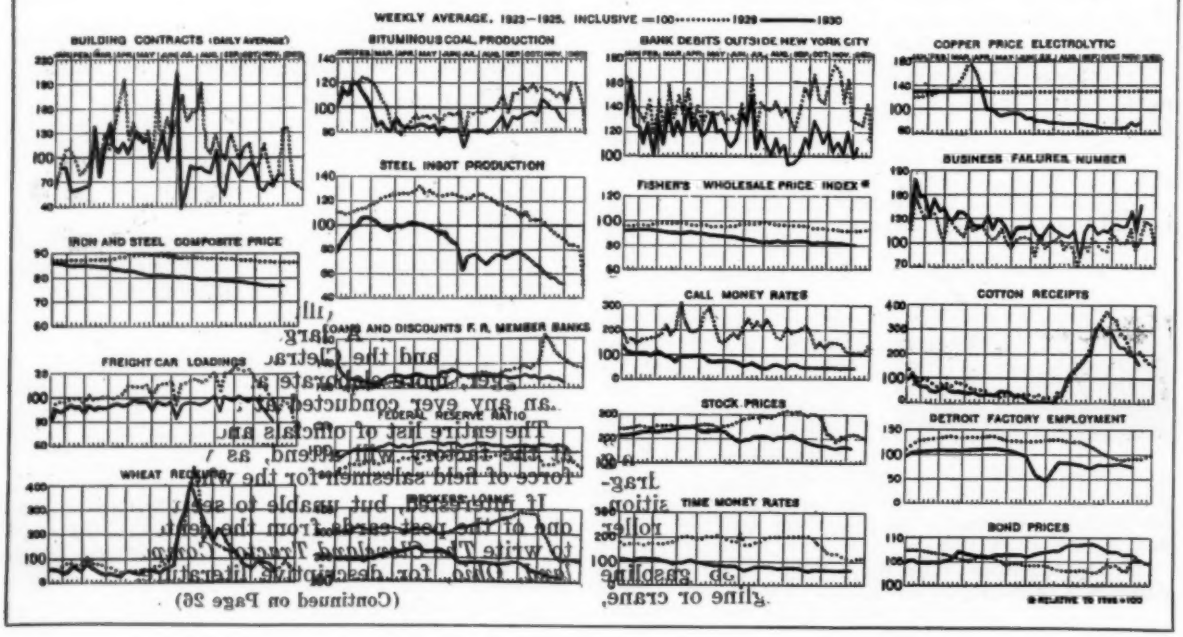
It seems quite generally accepted by today's business commentators, that the present major depression has about run its course and that from now on we may look for no further declines of any moment, although business activity may stay at its present level for a few months and the improvement may be gradual.

One published view looks for a gradual improvement beginning in the Spring of 1931, and states further that activity will not get back to normal by the end of the year. That raises the question of "What is normal?" 1929 was certainly above normal and led directly to a depression — the natural corrective for the maladjustments of overstimulated business. It would probably be better over a period of years if business readjusts itself gradually from its present quiet state.

We find different views concerning the immediate future of the construction industry. There seems to be, however, practical agreement that public works will be carried on in large volume during 1931, but that private construction will not be stimulated until the latter part of the year. It is a little difficult for us to agree entirely with the latter half of this statement, for dropping building costs should stimulate additional residential building before twelve months have passed, despite some over-building of residences during the years prior to '29.

Standard Statistics Company is quoted in a recent McGraw-Hill Publication as follows: "In addition to the encouraging indication that the

WEEKLY BUSINESS INDICATORS



(Continued on Page 26)

next major trend of the residential building division will be upward, the one other bright spot of importance in the industry is the advance of public works and utilities construction to new peak levels this year. Despite a let-down in this group in September (1930), October results proved relatively satisfactory, with the consequence that contract awards for the first ten months were 15.6 per cent larger than in the corresponding period last year, and 11.6 per cent above the 1928 peak.

"Putting it another way, the present dismal general building year is providing some surprisingly cheerful public works and utilities statistics. Even to the end of October the showing is better than for the entire year 1929, making certain that 1930, in this division, will be by far the best twelve months in history.

"Prospects for 1931 fully sustain the glow of the picture, because construction in this field should be well maintained, if not further stimulated, by virtue of the campaign now under way to increase expenditures for national, state and local improvements in order to combat the unemployment situation."

November contracts for new construction of all types awarded in the 37 states east of the Rocky Mountains totaled $253,573,700, according to F. W. Dodge Corporation. This compared with $337,301,400 in October and $391,012,500 in November, 1929. Of the November, 1930, total $101,096,000 was for new non-residential buildings; $80,781,900 for residential structures; and $71,695,800 for public works and utilities. Total new construction contracted for during the eleven elapsed months of 1930 was valued at $4,275,598,600, as compared with $5,437,922,400 for the corresponding eleven months of 1929.

Of the thirteen Dodge territories, eleven showed declines in November from both the preceding month and November, 1929; the New Orleans territory alone showed gains over both periods; while the Pittsburgh district showed a gain over November, 1929, and a loss from October, 1930.

CONVENTIONS

American Road Builders' Association
(and "Road Show")
St. Louis, Missouri....January 12th to 16th, inclusive

National Crushed Stone Association
St. Louis, Missouri....January 19th to 22nd, inclusive

Associated General Contractors of America
San Francisco, Calif., January 26th to 28th, inclusive

National Sand and Gravel Association
St. Louis, Missouri....January 27th to 29th, inclusive

National Paving Brick Association
Pittsburgh, Penn.....February 4th to 6th, inclusive

Iowa Steps Out of the Mud

(Continued from Page 9)

the dirt and also was called in from time to time to clean up the spill on the slab. There was also a team-hauled Western 6-foot blade, and two additional teams using fresnos, slips and mormans with about 20 hand laborers working behind the dragline-truck outfit taking care of light cuts, entrance roadways, culverts, trimming and so forth.

Average output 1800 to 2000 yards a shift

Output with the two Bucyrus-Erie 1030 draglines ran from 1800 to 2000 yards per day — an excellent performance considering the nature of the work. Gasoline consumption ran from 45 to

The car man swings the Blaw-Knox bucket close in against the side of the car for cleaning up.

60 gallons per 12-hour day. The ready mobility of the machines was particularly valuable on this work as, with the light digging, there were plenty of moves to make.

Delays for turning avoided

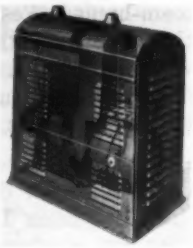
Where possible, the trucks worked in chain gang with dumps both north and south of the draglines. Empties from the south dump would travel north, catch a load at number one dragline, carry it to the north dump, return to number two dragline, load, haul to the south dump, and so forth. This avoided time lost in turning the trucks at the draglines. The organized team work of the truck drivers on this job was truly remarkable and it was seldom that the draglines had to wait for empties though they were digging right along

(Continued on Page 50)

Equipment You Ought to Know About

(Continued from Page 23)

Kohler's Exhibit at St. Louis



TWENTY-FOUR hour operation of equipment used by road builders, construction and excavating contractors, oil well drillers and others engaged in outdoor work is made possible by a sturdy, self-contained Kohler electric plant, which will be displayed in the Kohler of Kohler exhibit at the Road Show.

This plant, Model EH, 1½-K. W. 110-volt D. C., is adapted especially for mounting on sledges, excavators, draglines, dredges, ditchers, pavers and other construction equipment. The unit is compact, measuring only 16x37x35 inches, and a strong sheet metal housing protects its smooth-running four-cylinder engine and direct-connected generator from the elements, and also encloses a 7-gallon gasoline tank. All controls are on the outside of the hood. Neither vibration nor a sudden jolt affects the action of the plant.

Besides furnishing current for floodlighting, which illuminates the entire working area, walks, roadways and pitfalls, Kohler plants operate such power equipment as motors, pumps, air compressors, lathes, drills and saws. Three different models, one a cut-away type, will be exhibited.

Descriptive literature may be obtained by writing *Kohler Company, Kohler, Wisconsin.*

Iron Mule, Roustabout Crane, and Dump Truck Hoist Shown by Hughes-Keenan

THE *Hughes-Keenan Company, of Mansfield, Ohio,* is showing at Booth No. 18, Exhibition Building B, at the St. Louis Road Show: the 4-yard "Iron Mule" mounted on the McCormick-Deering Industrial Tractor Model 20, the Roustabout Crane, and the latest model, heavy-duty, hydraulic hoist, dump body.

The Hughes-Keenan "Iron Mule," a 2-yard or 4-yard dump body with complete dumping mechanism, mounted on either McCormick-Deering Industrial Tractor Model 20, or the Allis-Chalmers Model "U" Industrial Tractor, is ready for service when shipped. Either size is a complete dumping unit primarily for hauls of 500 to 600 feet. The driver has a clear view at all times over and around the load, allowing him easily and quickly to spot the "Iron Mule" under shovel or dragline for loading and dumping.

The "Roustabout" is an all-purpose crane, mounted on various standard industrial tractors, especially for industrial plant use. Furnished complete, mounted on a tractor, it easily handles all kinds of material, sets posts and dies, lays sewer or water pipe, handles flasks and castings, loads and unloads cars, and accounts for a host of miscellaneous but important transportation duties. The rated capacity is 2,000 pounds with horizontal boom and full swing; boom swings through complete circle in either direction; boom and load are raised and lowered separately, all power-operated. The machine passes through door opening 5 feet 8 inches wide by 7 feet 9 inches high, with ample clearance.

The heavy-duty Hughes-Keenan hydraulic hoist for dump trucks is of the under-body type. Very simple in design and easily installed, it operates efficiently under the most severe conditions. It is designed for use with dump, coal and garbage bodies, and for standard stake or platform bodies to convert them into dumping units at low cost. This hoist has a horizontal cylinder, 5 inches inside diameter, and special type of link-connected lifting arms. A sturdy, rigid structural steel frame supports the hoist. Body mounting is unusually low, and yet the rear end dumping clearance is very high.

Hoist is supplied as a completely assembled unit ready to drop in place on truck. Hoist is controlled entirely by two levers in cab. At ordinary engine speed, hoist will reach its maximum dumping angle in five to seven seconds, with full load.

Hayward Shows New Bucket

IN Road Show booth AR-20-A, *Hayward Company, 50 So. Church St., New York,* will feature their new Class "K" Digging Clamshell bucket, a development of the past year. The bowl of the bucket is made of one-piece steel construction, has manganese steel bushings, shoes and teeth, and hardened steel shaft and pins. The rods are of extra heavy pipe; the upper and lower ends are steel castings and the whole is electrically welded into one piece.

There will also be on display, models and photographs of the Class "E" Rehandling Bucket; Class "K" Digging Buckets; Standard and Multipower Orange Peel Buckets and also their Drag Line Bucket.

Those who do not expect to attend the St. Louis show can obtain information regarding these buckets by addressing the above and mentioning *The Excavating Engineer.*

Pneumatic Tools Exhibited by Ingersoll-Rand

INGERSOLL - RAND COMPANY, *11 Broadway, New York,* will exhibit the following equipment at the 1931 Road Show: X-71 drifter-type rock drill on Type D wagon mounting; Type 20, 10 x 8 portable compressor on rubber-tired wheels; Type 20, 5½ x 8 portable compressor on steel wheels; cross-sectional assembly of the free air unloader used on Type 20 portable compressors; Type 30 air-cooled portable compressor of 30 c.f.m. piston displacement; No. 50 drill steel sharpener; complete display of "Jackhammers," paving breakers, and pile drivers; complete line of pneumatic tools applicable to road and bridge work.

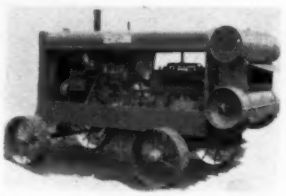
The Type 30 portable compressor (illustrated) is being shown for the first time. It will operate one or two pneumatic tools, and is designed to furnish air for such services as grinding, chipping, scaling, concrete surfacing, paint spraying and the

like. It consists of a 2-stage, air-cooled ball-bearing compressor driven from a Fuller-Johnson 4-cylinder gasoline engine. It is equipped with air cleaners, automatic unloader and governor, and a 16 x 40 A. S. M. E. air receiver. Mounted on steel wheels, it is enclosed within a housing which has removable side covers.

The Ingersoll-Rand exhibit will occupy Booths B-54 and B-69, located in the central portion of Exhibition Building B.

Complete information regarding the new Type 30 compressor or other Ingersoll-Rand tools may be obtained by addressing the manufacturer direct. We will appreciate your mentioning *The Excavating Engineer.*

Schramm Exhibits New Diesel Compressor at Road Show



IN ADDITION to an exhibit of their complete line of portable compressors, pneumatic tools and accessories, *Schramm Inc., of West Chester, Pa.,* will introduce their new Diesel-engine driven compressor at their Booth B-42. The new machine, illustrated above, has a displacement of 360 cubic feet of free air per minute and is suitable for 100 pounds maximum working pressure. This Model 360 offers Diesel convenience and economy in addition to the standard Schramm compressor features. The engine is a Buda Type M. A. N. high-speed, full Diesel.

Further details regarding this or other Schramm compressors may be obtained by writing to the manufacturer.

Western at the Road Show

THE EXHIBIT to be made by *Western Wheeled Scraper Company of Aurora, Illinois,* at the Road Show, Booths A-25 and A-43, will be confined to a few new Western machines.

An entirely new Western elevating grader will make its first appearance in public. The basis of this new elevating grader is a 12-inch tubular "backbone," giving great strength with minimum weight. A separate power unit is used for elevating the dirt after reaching the belt. Without going further into mechanical details, it is sufficient to say that the individual machine to be exhibited at the Show has a record of actual roadwork of 17,800 cubic yards of pay dirt in sixty hours, delivered into wagons and hauled from a borrow pit. Moving pictures of the work will be shown.

A Western Crawler Dump Wagon with direct hitch and equipped with the new Western Spring Wind-up also will be featured. This spring wind-up is simplicity itself and acts instantaneously. The doors can be tripped and wound up by either the tractor driver or the dump man, thus relieving the regular wagon man for other work.

A third new Western machine, to be shown for the first time, is a Rotary Fresno of two cubic yards capacity, strike-off measure, designed and built to utilize the full power of a 60 to 75-horsepower tractor for moving dirt. The operating principle is similar to that in the smaller sizes of Western Rotary Fresnos, except that all operations are controlled by the tractor driver by means of a single rope. When the scraper has secured a full load, the drawbar pull of the tractor is automatically utilized to pull the cutting edge out of the ground and into carrying position. This is a cut-and-carry tool that will permit highway officials and road contractors to utilize their large tractors.

If you'd like to know more about these new machines, write Western, mentioning *The Excavating Engineer.*

Hug Exhibit at 1931 Road Show

THE *Hug Company, Highland, Illinois,* will have a complete exhibit of its specialized roadbuilding trucks and roadbuilders' equipment at the Road Show in St. Louis.

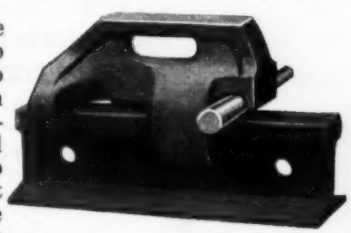
The exhibit will consist of a complete line of up-to-date roadbuilding transportation equipment, including trucks especially designed for single batch, double batch, excavation and dirt moving work and for the transportation of ready-mixed concrete. Several new features of design will also be introduced and exhibited for the first time at the 1931 Road Show. The exhibit will include the following equipment: Models 60, 85-D, 87-M, and 67 Hug Roadbuilders; also Model 87M with special Tracktor Unit and Model 97-6 Hug Roadbuilder. Descriptive literature on any of these models will be gladly furnished on request.

An outstanding characteristic of the Hug Roadbuilder, which is especially designed for roadbuilding and dump truck work, is the short wheelbase and setback front axle design. The setback front axle design provides for equalized load distribution and makes possible the short wheelbase and turning radius, and in addition distributes the weight over all four wheels, reducing the bearing pressure on the rear wheels.

In addition to the complete line of roadbuilding transportation equipment, The Hug Company will also exhibit the Hug Subgrade Template, a specially designed template to indicate the high or low spots in the subgrade, and The Hug Subgrading machine and The Hug Turntable. The Hug exhibit will be in the west wing of the Arena, Space B-35.

New Round Wedge Rail Clamp

If you are operating any equipment mounted upon railroad trucks you will be interested in the recently patented Round Wedge Rail Clamp offered by *Bucyrus-Erie Company, South Milwaukee, Wisconsin.*



The round wedge requires only a tap of the hammer to lock the clamp in place and the pressure of the wheel against the clamp will tighten it. It will not work loose under successive impacts and it is constructed so that any increase in pressure against the clamp causes it to become more tightly locked to the rail.

The first pattern was made for 110 pound rails and many of that size are now in use, giving great satisfaction. Clamps for other sizes of rails can be supplied. For further information write the Bucyrus-Erie Company, Specialty Department, South Milwaukee, Wisconsin, mentioning this magazine.

(Continued on Page 51)

This protection costs nothing to get

—*yet it is priceless protection to the user.*

Making Sure is the very fundamental rule among careful workmen.

Nearly every industry of any importance has "safety engineers" — men employed to study and put into practice methods for the protection of workmen.

If you are one who is interested in protecting your co-workers and not using "Williamsport" wire rope — may we ask you "How do you **make sure** of getting the grade — or tensile strength of rope you order? — do you accept the marking on the reel, or tag, and let it go at that or do you make a laboratory test?"

A Telfax Tape is woven into Williamsport wire ropes to give you definite facts as to the grade of steel used in its manufacture. It cannot be removed, and if it changes reels the Telfax Tape goes with the rope. This is not always true with a tag.

Why not carry out your safety idea thru the use of "Williamsport" wire rope?

Williamsport Wire Rope Company

Main Office and Works,
WILLIAMSPORT,
PENNSYLVANIA

General Sales Offices
Peoples Gas Bldg.
CHICAGO

For your convenience in writing Williamsport Wire Rope Company you will find a card bound in this issue.

SHOTS FROM THE FIRING LINE

Bids Invited on Boulder Project To Be Opened March 1st

Plans and specifications covering construction of Hoover Dam, at Black Canyon on the Colorado River, as submitted by Dr. Elwood Mead, Commissioner, Bureau of Reclamation, have been approved and invitations for bids called for.

All work in connection with the storage and power enterprise, including the cofferdams for river diversion, diversion tunnels, the great dam itself, outlet works, freight elevator, power house, and incidental features, will be included in a single contract. Congress has authorized the expenditure of $165,000,000 for construction of the Boulder Canyon Project, including the All American Canal. Of this amount $108,000,000, exclusive of interest charges, are available for expenditure at Black Canyon. This must cover payments to the contractor and cost of materials such as cement or reinforcing steel, to be furnished by the Government.

Due to the inaccessibility of the work, the magnitude of the operations, and the severe weather conditions during a part of the year; and having in mind the health, comfort and general welfare of those engaged in the work, it has been decided to establish the Government town of Boulder City, Nevada, located approximately 23 miles southeast of Las Vegas, Nevada, and about 7 miles from the dam site.

At present there is a gravel road, in fair condition, from Las Vegas to a point on the Colorado River from which the dam site can conveniently be reached by boat. A highway between Boulder City and the rim of the canyon above the dam site on the Nevada side of the river will be constructed by the Government. This highway will have an oiled gravel surface, with maximum grade toward the dam of 4.0 per cent and from the dam 6.7 per cent. It is contemplated that the highway will be completed and ready for travel by July 1, 1931.

A railroad for use in transporting construction materials to the vicinity of the dam site will be constructed by the Government. This railroad will run from its junction with the branch line of the Los Angeles and Salt Lake Railroad of the Union Pacific system, to a point about 1,500 feet west of the dam on the Nevada side of the river. There will be no upgrade toward the dam, and the maximum grade from the dam will be about 3.0%. The railroad will be standard gauge, of substantial construction, and will consist of a single track. The specifications provide that the contractor shall construct at his own expense all side, passing, spur and switching tracks and wyes required for his operations, and shall furnish all necessary rolling stock and other equipment required for the operation and maintenance of the road. The contractor will be required to operate and maintain the railroad and to haul and handle all materials delivered to him by the Government for use in constructing the dam and related works. It is contemplated that the railroad will be completed and ready for operation by September 1, 1931.

The specifications contain a labor clause whereby the contractor will be required to give preference at the time of employment to qualified ex-service men and American citizens.

The dam will be of the massive concrete arch-gravity type, approximately 730 feet in height above the lowest point of foundation rock and 1,180 feet long at the crest. It will be constructed with a radius of curvature of about 500 feet as measured at the axis of the dam and will contain miscellaneous inspection galleries, stairways, elevators and an extensive drainage system. The foundation and abutment rock will be drilled and pressure grouted, following the operation of stripping the foundation and canyon walls of all loose or otherwise unsuitable rock. Large spillways will be built, one on each side of the river. Outlet works will consist of intake towers — two on each side of the river above the dam — pressure tunnels driven through the rock of the canyon walls and valve houses built at two

(Continued on Page 50)

New England Notes

By C. B. Mc COWN

The usual winter state highway lettings are now taking place. Among the larger jobs recently awarded is the Chester-Huntington job, which went to the **Fitchburg Concrete Construction Company.** This is a cut-off job of highway in the Berkshires — heavy excavation. This section is about four miles in length, through very rough country, and will require the moving of about 240,000 cubic yards of material.

Railroad grade crossing elimination will mean a great deal of shovel work in Massachusetts this year. A job in Attleboro of this type has been let to **P. J. Holland,** Lawrence, Massachusetts, and another in Weston to **J. P. McCabe,** of Boston, Massachusetts.

The State of Vermont plans to continue its hard-surfaced road program this coming year, contracting for about fifty miles.

New York Notes

By T. A. BILLINGS

Foley Bros., General Contractor of New York, have about completed their contract for elevating all L. I. R. R. tracks through Jamaica, Long Island. This job had an approximate yardage of 550,000 yards of earth fill, which was sublet to the C. V. Service Company of Mineola, Long Island.

Shovel equipment on this job consisted of one 50-B Bucyrus-Erie Diesel and one 600 P & H Gas shovel. Transportation was furnished by a fleet of five-ton Mack trucks, which had an average haul of about one mile for the entire job. On this work, the 50-B moved approximately 300,000 yards of the total yards with a fuel consumption of 40 gallons of fuel oil per 9 hours. P & H has credit for about 150,000 yards, and the remaining amount of yardage in the fill was furnished by local excavaters.

Collins Brothers of Albany, New York are using their Cletrac "80-60" equipped with an Essex Hydraulic Bulldozer to good advantage on their highway job between Albany and Amsterdam. This dirt-moving combination keeps the road clear of rocks and levels the dirt fills. The road is being widened and necessitates blasting the side of a hill at the edge of the road. The Cletrac and Bulldozer plow a passage through wide enough to take care of traffic until shovel, wagons and trucks can come in and remove the material. This use of an adjustable bulldozer coupled up to a tractor which furnishes the propelling power, is one of the significant changes from the old to the newer, faster and less laborious ways of leveling dumps, clearing up debris, and other work of similar nature.

Now Ready

Index for The Excavating Engineer
Volume XXIV - 1930
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THE EXCAVATING ENGINEER

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Double Fulcrum

AIR DUMP CARS

INSURE LOW HAULAGE COSTS

OPERATING CHARACTERISTICS OF DIFFERENTIAL CARS

Air Operation—Operation of a small valve handle is all that is necessary to dump a car. Cars dump to either side and may be arranged so that an entire train may be dumped from the locomotive or from any one car in the train.

Low Height—The double fulcrum principle allows the body to be carried over the bolster side bearings at a considerable reduction in the height of the car. This low height is a distinct advantage in loading.

Stability—The stability of the Differential Car prevents derailments, spilling of the load in transit, and promotes safety.

Dumping Action—Dumping is quick and sure, yet there is no shock at the end of the dumping stroke to damage track structure, trestles, or the car itself.

Casting the Load—The combination of the double fulcrum principle and down-folding door casts the load well away from the track.

Car can dump materials of any size and cast load well away from track.

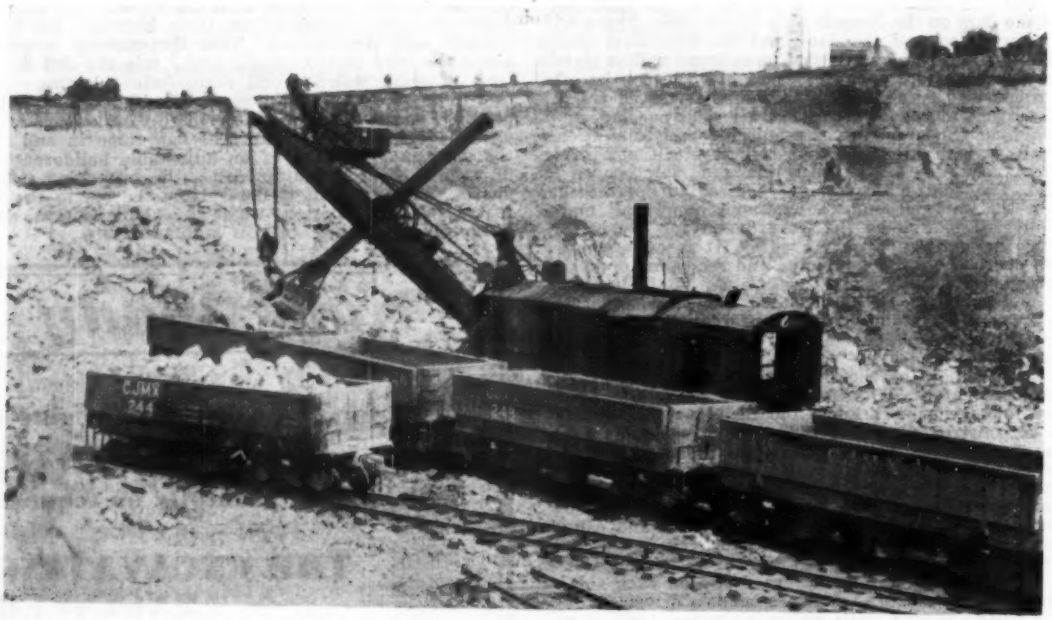
Door Operation—Door automatically folds down during the dumping operation and closes itself when the body returns to central position. Operating hinges along each door insure perfect operation and alignment. Adjustable steel wearing strips fit the doors up closely to the car body and prevent leakage of finely divided material.

Safety—The car cannot dump accidentally. There is no locking mechanism to fail and cause accidental dumping. There is no chance for accidental dumping due to leaky valves.

Differential Air Dump cars, Differential Mine cars, Differential Locomotives, and other Differential haulage equipment can satisfy any probable requirement. Submit your haulage problem to us and let us recommend equipment for low haulage costs.

THE DIFFERENTIAL STEEL CAR CO.

FINDLAY, OHIO



Differential cars are constructed for the most severe type of service. The doors and floors particularly are constructed to withstand heavy loading conditions.

In writing to The Differential Steel Car Co. please use post card bound in the center of this number.

Shots From the Firing Line — *Continued*

Baltimore and Vicinity

By S. M. CHRISTHILF

H. W. Kaylor, well known contractor of Hagerstown, Maryland, was returned the low bidder for the construction of two and one-half miles of concrete roadway along the Parkhead Relocation on the National Pike in Washington County, Maryland. The Maryland State Roads Commission advertised the work at this time, due to the heavy excavation and drainage work in this contract, which totals 147,650 cubic yards, some of which will be rock. The time allowed for the completion of this work has been limited to May 1st, 1931. Mr. Kaylor has two 50-B and three Type B-2 Bucyrus-Erie machines to put on this job.

Washington and Vicinity

By ROBERT M. ROGERS

Looming above the skyline, the Capitol watches as the Bucyrus-Erie 20-B steamer, owned by **E. G. Gummel, General Contractor,** cleans up the site for the Union Railway Station's new plaza. The ¾ yard machine is digging out footings of the war-time government hotel buildings which formerly stood in front of the Station and which are now being wrecked by S. M. Osborne and Company of Havre de Grace, Maryland. Contractor Gummel is well satisfied with the performance of his 20-B. He states that it paid for itself on the first job seven years ago where it moved approximately 70,000 cubic yards of rock. And now after seven years in the hardest kind of service the machine is still able to stand the gaff when it comes to digging concrete and rock. Operator R. L. Rogers, 65 years young, is handling the levers.

Harry Campbell Sons of Towson, Maryland have been working their 42-B Bucyrus-Erie near Elkridge, Maryland. The above illustration was taken in October showing the shovel loading to Caterpillar-drawn, Athey-mounted Westerns in a 100,000 yard cut which was then nearing completion. William Grier is the operator on the 1¼-yard Bucyrus-Erie while Isaac Brown is shoveling the coal.

Pennsylvania Notes

Hauling coal in a strip pit near Hazelton, **P. B. Brown Excavating Company** of that city have been using an interesting hauling set up. Using a 1¼-yard Osgood gas they are loading to a fleet of Linn Tractors. Hauls average from ⅛ to ⅝ mile, loads from 5½ to 7½ tons per tractor, roadway conditions from jagged rock to deep mud with grades up to 37 per cent. According to A. C. Nielson Company who recently made a survey of the P. B. Brown operations, the Linns hauled from 91 to 180

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you're looking for
MORE POWER!
LESS FRICTION TROUBLE!
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Order Asbestos Blocks especially suited for your machine . . . selected after painstaking experimentation in the field—on all types of work. Under every condition.

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blocks and linings take hold—and hold, and hold—but they let go smoothly at your command. No after catches—no jerky starts. Write for prices, specifying your needs.

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For sixty-five years Johnston Brothers, Incorporated, have been building boilers for the outstanding engineering projects of the world. Engineers have come to know that if they demand a Johnston Boiler they can be sure of absolute satisfaction.

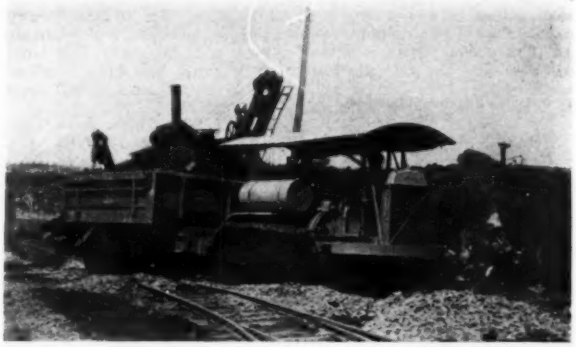
If you have a boiler problem it will pay you to secure the Johnston proposition.

JOHNSTON BROS., INC. FERRYSBURG, MICH.

Specializing in Boilers for Contractors' Equipment

Shots From the Firing Line — Continued

tons per 8-hour day per unit with cost figures including depreciation, interest, repairs, wages, fuel and so forth averaging $2.77 per hour or 15.3 cents per net ton. The Linn tractors are equipped with 100 h.p. Waukesha 6 cylinder motors and have transmissions giving four speeds in either direction.



Calcite Quarry Corporation of Myerstown, Pennsylvania recently installed two Caterpillar Sixtys and LaPlant-Choate 3-way dump wagons for hauling on their stripping operations. Loading with a Marion 1-yard steam shovel on a haul of 1200 feet the Caterpillar-LaPlant-Choate outfits handle on an average of 1000 yards each per ten hour shift. These outfits replace two trains with steam locomotives. An additional Caterpillar and Athey is also in service in the quarry.

Buffalo and Vicinity

By D. E. WHITE

Mr. Fitch, County Superintendent, Chautauqua County, should be complimented on the new office which has been constructed for the Chautauqua County Highway Department.

The many friends of **Bruce Chilson,** Assistant to Mr. Fitch, Chautauqua County Highway Superintendent, will regret to learn that Bruce was a patient in the hospital early in December, after undergoing a very painful operation. He has hopes of being home for Christmas.

L. A. Ransom, who has been operating Chautauqua County's Type B-2, was recently married. The bride was formerly Miss Lucille Maddon, and this wedding was the culmination of a school-time romance.

Another arrival in the ranks of Buffalo Operators has been found in the New York State District. **Kenneth Pierce, Porterville, N. Y.,** operating for Canoran Construction Company on their B-2 Erie crane, is the proud father of the new operator, Donald Kenneth, weighing 8¾ lbs. The mother and youngster are doing fine and the father is able to return to work—a little nervous but doing well.

Chicago Notes

By A. R. HANCE

Dolese Brothers Company, prominent quarry operators, have moved their general offices to Room 663-221 North La Salle Street, Chicago.

Question Out of Order

"Do you still run around with that little blonde?"
"She's married now."
"Answer my question!"

Not That Much!

"What shall I do? I'm engaged to a man who says he simply can't bear children?"
"Well, you can't expect too much from a husband."

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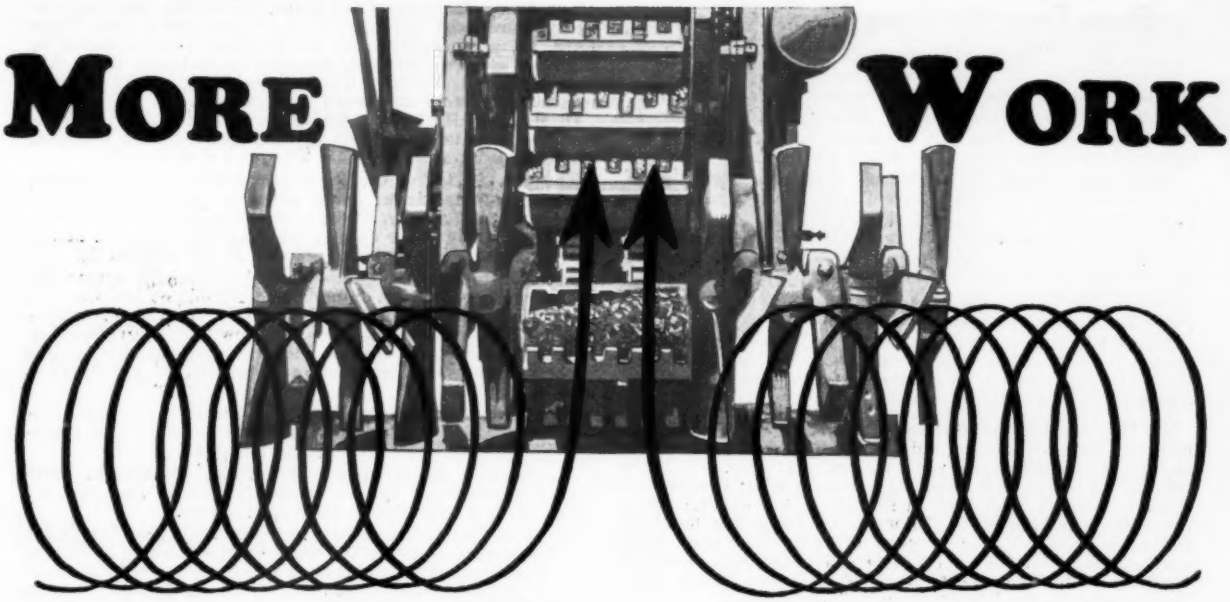
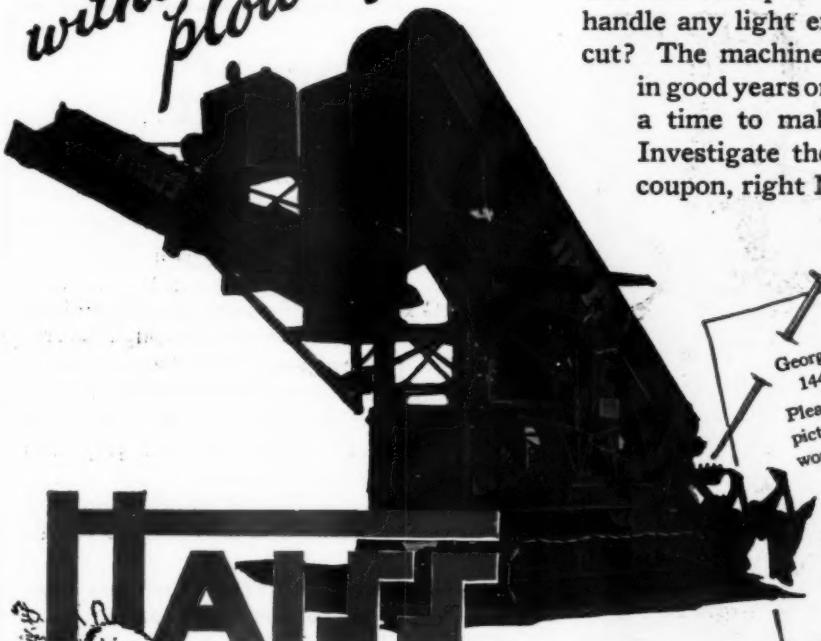


Per Dollar Invested

"it digs without plowing"



Shallow grading at the lowest cost per yard! Why think of spending half as much again—when a Haiss Excavator will take out up to 2 yards per minute and handle any light excavation up to a 4-ft. cut? The machine will save you money in good years or bad years—but now's a time to make every dollar count. Investigate the Excavator! Clip the coupon, right NOW.

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Please send me a copy of your Catalog picturing the EXCAVATOR—and the work it has been doing.

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Shots From the Firing Line — *Continued*

Southern Notes

By R. S. WELFER

A letting in Georgia in late November provided a number of contractors with good winter jobs.

Tennessee does not expect the recent bank failures to interfere with its highway program.

Smith and Bradfield, of Macon, Georgia, report good progress on their highway project near Meriwether, South Carolina.

Chandler Brothers have tested their Gas+Air shovel in tough shale digging near Centerville, Tennessee, and are pleased with their 35,000 cubic yard estimate.

Lee J. Smith has made a good start on two highway projects in eastern North Carolina.

North Carolina received bids early in December on twenty-one projects. They expect to spread the completion of their highway system over the next five years, spending about thirty-five million dollars.

By J. S. MOSHER

On December 2, the Highway Commissioners of the State of South Carolina, opened bids on one of their largest grading projects during the past season. An unusually large number of bids were submitted, representing contractors from the entire Southeastern section of the country. Bids are also to be opened at Columbia on December 30, 1930 for an unusually large mileage of concrete paving with some grading and several bridge contracts. This is all in keeping with their large highway program, which they inaugurated at the beginning of 1930.

St. Louis and Vicinity

By H. H. BUCHANAN

Gaines Bros. Company, Incorporated, are "hitting the ball" with their Gas+Air shovels on Route No. 54 Highway Grading Project, involving over 500,000 cubic yards unclassified excavation. For this project they purchased their fourth Gas+Air shovel of 1¼-yard capacity — a new Type GA-3. It is interesting to note that their Type GA-2, purchased in February, 1928, has been working continuously, without shut-down to date — that means double-shifting, with the exception of six months, during which time it was only working single-shift operation.

Len Gray, Highway Contractor, St. Louis, has just recently purchased his second Gas+Air shovel — a Type GA-3, 1¼-yard capacity, for his St. Louis County Route 66 Highway Grading Project, awarded in October. Gas+Air Shovel No. 1 is "hitting the ball" handling plenty of rock on a heavy 26-foot cut South of Kirkwood.

O. M. New, Highway Contractor, of Little Rock, Arkansas, just completed a heavy grading project near Camden, where he used a Diesel+Air 1¼-yard shovel.

The last section of the River Des Peres drainage works, an open channel about three miles in length, will be let some time in January. The project will cost about $1,000,000. The plans call for an open channel 205 feet wide at the top, 20 feet deep and 125 feet wide at its bottom.

Bids for the construction of a highway bridge across the Wabash River between Indiana and Illinois at Mt. Carmel, have been opened and the low bidder is the Vincennes Bridge Company of Vincennes. The low bid for grading the approaches on the Illinois side was submitted by the Powers-Thompson Construction Company, of Joliet, at a cost of $30,178.

The Central Illinois Public Service Co., of Springfield, Illinois, was granted permission to build a 4-inch gas transmission line between Canton and Havana.

A. Guthrie & Company, St. Paul, Minnesota, were awarded contracts by the Missouri Pacific Railroad for three bridges near Reeds Spring, Missouri.

Winston Brothers Company, of St. Louis, and Minneapolis, Minnesota, have started work on the grading and excavation for the 2,000,000-bushel elevator for the Missouri Pacific Railroad at Kansas City, Missouri. Bilhorn, Bowers & Peters, St. Louis, have the contract for driving the piles.

The East Side Levee & Sanitary District, J. D. Johns, President, Metropolitan Bldg., East St. Louis, Illinois, plans the diversion of the Cahoka Creek through East St. Louis and a new outlet to the Mississippi River. Estimated cost of the project, $1,900,000.

R. Waddell, City Engineer, Kansas City, Missouri, will soon take bids for the construction of a storm sewer in Gilham Road. Estimated cost, $140,000.

Titan Cartage Company, 18117 Martin Ave., Homewood, Illinois, has ten International trucks with four-yard bodies that they would like to put to work.

INTEREST PAYABLE—The use of a Hayward Bucket pays interest regularly in the form of lower excavating costs. Address The Hayward Co., 52-54 Church St., New York, N. Y.
Hayward Buckets

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GREDAG reduces cost of lubrication and maintenance under the most severe conditions.

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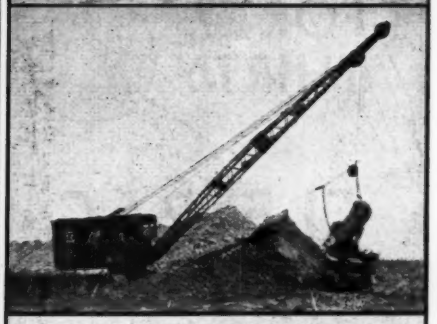
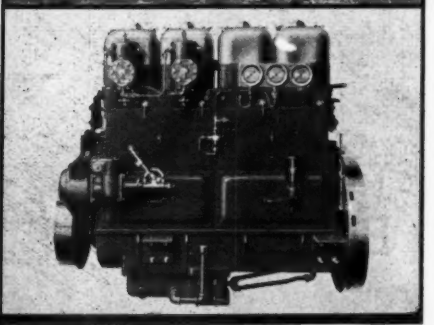
SUCH A VOLUME OF DIRT - MOVING RECORDS

HAS NEVER BEEN MADE BY ANY OTHER ENGINE...





A 1-yard shovel, you've heard, will earn from $2,000-$5,000 more per year, with a diesel than with a gas. engine. That was proved with an Atlas Diesel.

Or you read that a contractor, with a 1-yard shovel, moves 4,000 yards of dirt at a fuel cost of $5. That, too, is being done with an Atlas Diesel.

These low dirt-moving costs that you are hearing about, are being made almost entirely with Atlas Diesels. It was Atlas that introduced the diesel to excavators... seven years ago. Today... the Atlas Diesel is turning out these phenomenal records in hundreds of excavators, throughout the world.

Burning cheap, low-grade fuel oil, that costs only ⅓-¼ as much as gasoline, and consuming only ½-⅓ as much fuel... an Atlas Diesel will cut your fuel costs from 75%-85% below those of a gas. engine.

Having the unique lugging power (torque) of the steam engine... it will also increase your yardage from 10%-15%. No choking and stalling in tough digging. An Atlas Diesel digs-in and lugs all the harder, under heavy loads.

No troublesome ignition system, either. No spark plugs. No water troubles. No boiler to tend. In design and operation, the Atlas Diesel is one of the simplest engines made. It starts in ten seconds.

Because of the rigid factory inspection system to which every engine is subjected... every Atlas Diesel is uniform in its outstanding performance. Specify an Atlas Diesel, for your next excavator. And mail the coupon for an interesting bulletin of facts.

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Bucyrus-Erie Excavators . . P & H (Harnischfeger) Excavators . . . Link-Belt Excavators . . Thew-Lorain Excavators . . Moore Speedcranes . . Plymouth Locomotives, Lidgerwood Logging Equipment

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CLETRAC ????

NEW!

To be announced at the Road Show

CLETRAC TWENTY

CLETRAC FORTY-THIRTY

NEW!

CLETRAC FORTY

CLETRAC EIGHTY-SIXTY

At the ROAD SHOW

you will find the Cletrac Exhibit in Building "A" in adjoining spaces 24 and 44, January 12 to 16, at St. Louis.

C L E

C R A W L

NEVER before in a single tractor line has there been offered so extensive an array of industrial power units as you find in the 1931 Cletrac line-up. With a power range up to a maximum delivery of 80 h.p. in the big 80-60, the line meets fully every power need in road and general contract work. Up-to-the-minute in every mechanical detail — rugged as tough steels and sound design can make them — dependably powered with the most modern of tractor motors — these Cletracs offer unquestionably the greatest values from which to select your 1931 tractor equipment.

— Automatic lubrication on all models

— Exclusive, patented planetary gear steering

— Remarkably low oil and gas consumption

See the Cletrac full line exhibit at the ROAD SHOW. The new smaller Cletrac with its marked advantages for small horsepower jobs — the new Cletrac "40-30" with its trim lines and superb performance — the Cletrac "20" — the old, trusty "40" — the incomparable "80-60" — all of these will be there to give you at first hand a complete picture of how Cletrac can serve you.

Literature on any or all models will be mailed on request.

The Cleveland Tractor Company

19327 Euclid Avenue Cleveland, Ohio

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TRACTOR TRACTORS

TO BE ANNOUNCED AND EXHIBITED AT THE ROAD SHOW JANUARY 12TH

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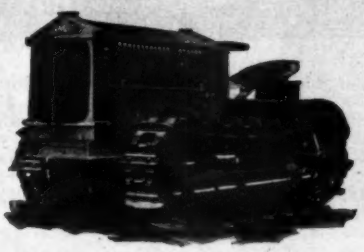
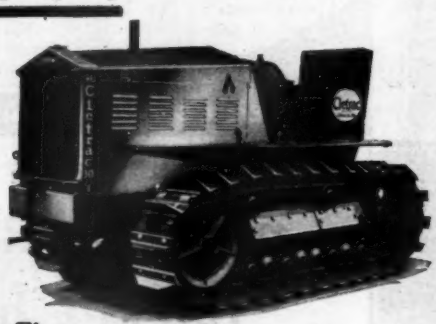
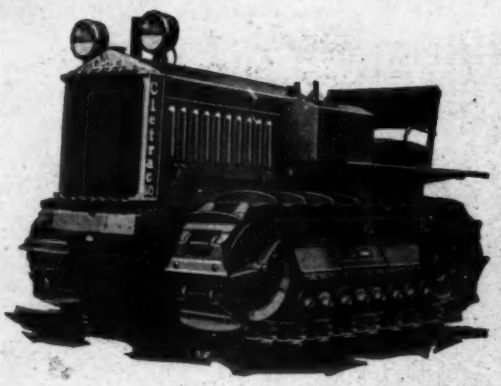


The TWENTY

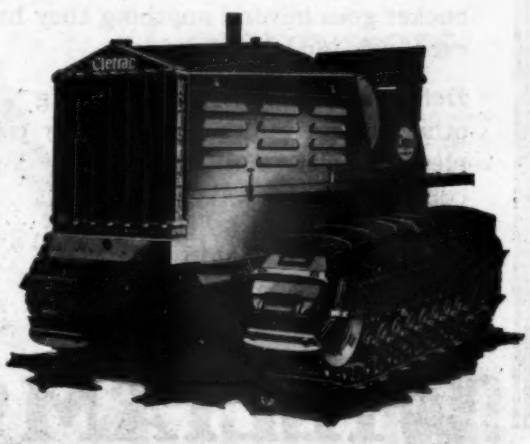


The FORTY-THIRTY

NEW!



The FORTY



The EIGHTY-SIXTY

In writing to The Cleveland Tractor Company please use post card bound in the center of this number.

Shots From the Firing Line — *Continued*

Oklahoma Notes

By H. E. SNIPE

J. J. Harrison of Lindsay, Oklahoma, is increasing the value of some 600,000 acres of Oklahoma land from $30.00 to $100.00 an acre by building 8 to 9 miles of drainage ditch, including laterals, requiring about 900,000 cubic yards of excavation. This locality was known at one time as the largest broomcorn center in the world, and is also well known for its alfalfa. Mr. Harrison is using the Bucyrus-Erie Diesel dragline shown above for his excavating. It is equipped with a 50-foot boom and a 1½-yard Page bucket. On a 145-degree swing, Operators J. E. Yocham and T. C. Gaskill seemed to be getting away with three passes in 80 to 85 seconds without any difficulty in the present digging. The E-2 is equipped with an Atlas Imperial Diesel engine, and a Kohler light plant gives brilliant illumination for night operation.

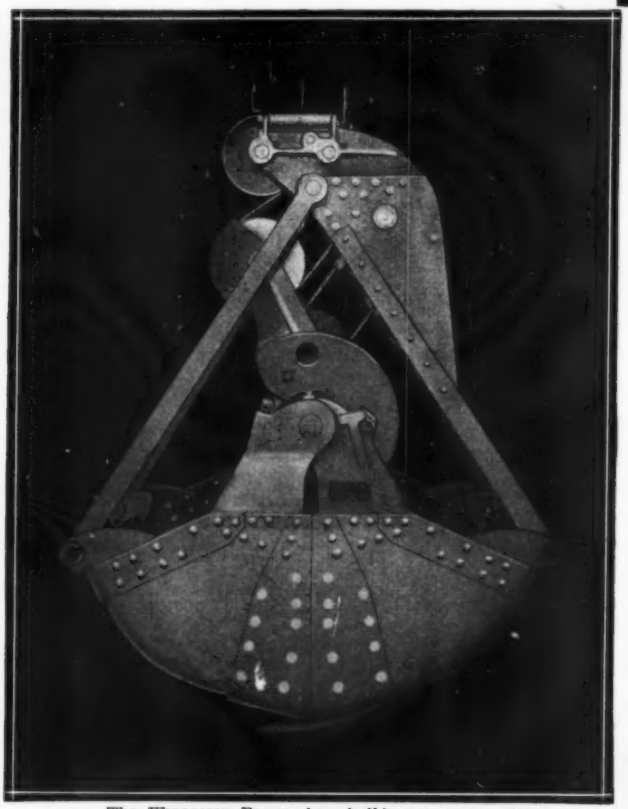
Fleet Sales

During 1930 many new Hug fleets have been established. Numerous original fleet owners have added to their present equipment. These endorsements of Hug equipment by hundreds of leading contractors and roadbuilders reflect the constant trend to specialized roadbuilding transportation equipment.

The Hug Roadbuilder is not an ordinary commercial truck. It is a specialized transportation unit with exclusive Hug features essential for roadbuilding performance.

You are invited to visit the Hug Exhibit at the 1931 Road Show, January 10—16, at St. Louis, Missouri.

THE HUG CO., Highland, Illinois



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Use the

most powerful bucket built—

The new

WILLIAMS "Champion"

Contractors tell us that this new super-bucket goes beyond anything they have ever had, for hard digging.

Definitely guaranteed to outdig any other bucket built. Write us for complete details and make your own comparisons.

G. H. WILLIAMS COMPANY

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WILLIAMS

BUCKETS—TRAILERS

256

Zenith Limestone Company of Tulsa is keeping their Bucyrus-Erie Gas + Air and 50-B electric shovels busy filling orders for crushed stone. Mr. Powell, superintendent on the job, is much in favor of the Gas + Air 1¼-yard shovel for quarry work, as he frequently uses the air compressor for jackhammer work. Henry Bristol is pulling the levers on the GA-2 and reports that this machine is operated easier than any other make of shovel he has worked on.

J. E. Smith & Sons, Collinsville, well-known contractors, are at work on Highway No. 16 in Rogers County. They are using a Bucyrus-Erie Type 1030 shovel and are moving from eight hundred to a thousand yards a shift. Mr. Smith reports that the 1030 machine is going right along with very little lost time.

Pacific Northwest Notes

By W. J. BRETT

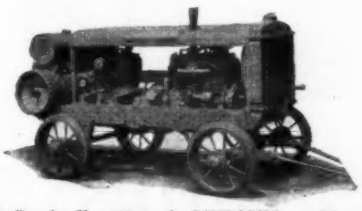
Washington State Highway Commission at Olympia on November 18th received bids from 30 contractors to move 106,600 cubic yards. Prices ranged from 18 to 35 cents per yard. Apparently many contractors will be idle this winter. J. S. Peterson of Enumclaw, Washington was awarded the work at $32,195.00.

Morrison-Knudsen of Boise, Idaho were awarded the work for moving 75,000 yards in state road No. 8 in Klickitat County.

Mr. Endicott of Madras was in town this week getting equipment together to start moving the 194,000 yards on the Roosevelt Highway south of Yachats. This work will be done with cats and dragline until spring when he expects to put a power shovel on the job.

We asked **Gene Densmore, Secretary of Shovel Operators Union** a week ago, how many shovel men belonging to the Portland local Union were experienced Diesel-Air operators. He reports 27 of his men have had one month or more of these machines, so there should not be any trouble getting experienced runners for the Diesel-Air machines.

The Western Lumber Company finished their railroad building for this year last week and laid up the 1¼-yard Diesel-Air till next spring. Operator Anderson called at the office and stated no repairs have been needed to date. The shovel has been operating six months.



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Portable Air Compressors

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Which wire rope to use on your equipment—which brand will give the longest and most economical service—may be best determined by past records of performance established under similar operating conditions. This and the reputation of the maker are of paramount importance.

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The NEW WESTERN No. 6 Elevating Grader

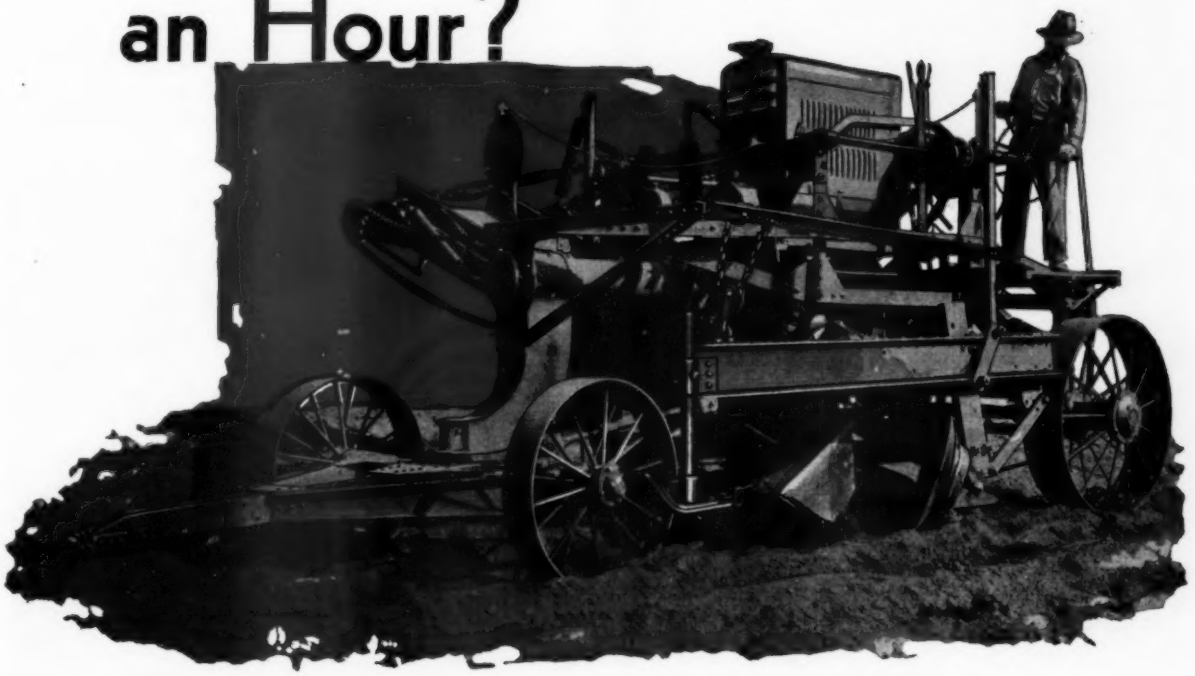
Will be shown for the first time at the Road Show in St. Louis, January 10-16, booths A-25 and A-43.

A radical departure in elevating grader design is the three point suspension of the frame of this machine. This eliminates distortion and the resulting ills of "floating" belt and racking the frame.

The backbone of the frame is a tubular member of great strength. The belt is driven by a motor mounted on the machine. These and other features give the Western No. 6 the strength and flexibility to handle an enormous yardage.

In writing to Western Wheeled Scraper Co. please use post card bound in the center of this number.

Will Your Elevating Grader Load 300 Cubic Yards an Hour?



The Western No. 6 Does It

In actual road work it has loaded 17,800 cubic yards of pay dirt in 60 hours. Think of it—a machine that can load 300 cubic yards an hour—that will cut a furrow 14 inches wide and 20 inches deep with the tractor in second speed—that can plow the ***first*** furrow to full depth in opening a new pit.

You will want to see this machine at the Road Show and the moving pictures of it in operation. However, if you do not attend, our Bulletin 31-CK just off the press, gives a complete description. Write for it today.

Western Wheeled Scraper Company

DUMP CARS AND GRADING EQUIPMENT

AURORA, ILL., U. S. A.

WESTERN

Highway Forecast 1931

(Continued from Page 21)

Highway building today is seldom a teaming job. Horses and mules have in most outfits been replaced by more powerful and efficient machines. On this Lobnitz Brothers' job near Pine River, Minnesota, Caterpillar Sixties pull the big Western wagons on their Athey Truss wheels. At the right the Bucyrus-Erie 1030 straight gas shovel with ⅞-yard dipper is filling 'em up. Lobnitz Brothers turned out 55,000 yards with this outfit from May 20th to June 20th.

Mississippi

$500,000 for new roads and $1,600,000 for paving are the estimated amounts which will probably be spent by the Mississippi State Highway Department in 1931. The new roads will cover about 50 miles; the paving, 75.

Missouri

The Missouri State Highway Department has not finished compiling the reports of the work done this year. As soon as the annual summaries are completed The Excavating Engineer will publish a digest of the information therein. The American Road Builders' Association forecasts a total expenditure on Missouri State Highways of $33,500,000 for 1931. Twenty-eight million dollars of this will be for maintenance.

Montana

Forty per cent increase over 1930 is expected in Montana's road program.

The program for 1931 is necessarily indefinite at the present time. It is expected that a bill will be introduced in the coming session of the Legislature providing for the sale of one and one-half million dollars in gasoline tax anticipation debentures each year for four years.

The proceeds from such sale together with the balance of the gasoline tax revenue remaining after the costs of administration, engineering, maintenance, and payment on debentures are deducted will be used to match Federal Aid making a total construction fund estimated at six and one-half million dollars. The following forecast is based on that amount.

About 400 miles of new roads will probably be constructed at an approximate cost of $4,000,000. In addition county and local road building will probably be made involving expenditure of another $4,000,000. Reconstruction on 100 miles of present highway is estimated to cost $500,000. Excavation to complete this program is expected to total some 6,500,000 cubic yards. In addition 1,000,000 cubic yards will be carried over into 1931 from old contracts and will involve expenditure of about $650,000. Montana will build no paving in 1931 but will gravel about 400 miles at a cost of $1,400,000.

Nebraska

No very definite information can be given as to next year's road program in Nebraska. This in view of the fact that a considerable change is expected to be made wherein additional paving program is hoped to be accomplished. In case the present law is continued, approximately the same amount of work will be done in 1931 as in 1930; however, a substantial increase in paving up to three hundred miles per year is being advocated.

During 1930, Nebraska built approximately 266 miles of new grading on Federal Aid Roads at an estimated cost of $1,240,000, and State Roads costing approximately $570,000. Reconstruction on Federal Aid roads totaled 90 miles and cost some $350,000.

The grading of a considerable amount of the mileage of the State Roads was performed by State forces. A large part of this was blade grader work and was done at low cost per mile. Yardage measurements were not made on this work.

Contracts were awarded for approximately 4,550,000 cubic yards of excavation of which approximately 3,800,000 cubic yards was on new grading and 750,000 cubic yards was on reconstruction work.

It is anticipated that by the end of the year the Department of Public Works will have let contracts for 113 miles of paving, including regrading costing approximately $3,000,000 and 490 miles of gravel surfacing costing approximately $1,225,000.

Condon Cunningham & Lemmon of Omaha, Nebraska, subbing for Conlin Construction Company of Maplewood, straightened this kink in Deer Creek on a recent highway improvement in St. Louis County, Missouri. Widening this Manchester road between Maplewood and Brentwood involves an expenditure of a quarter million dollars. Operator Hubert Lammers is at the levers of the Bucyrus-Erie 1020 equipped with Leschen rope, Waukesha engine and Owen bucket.

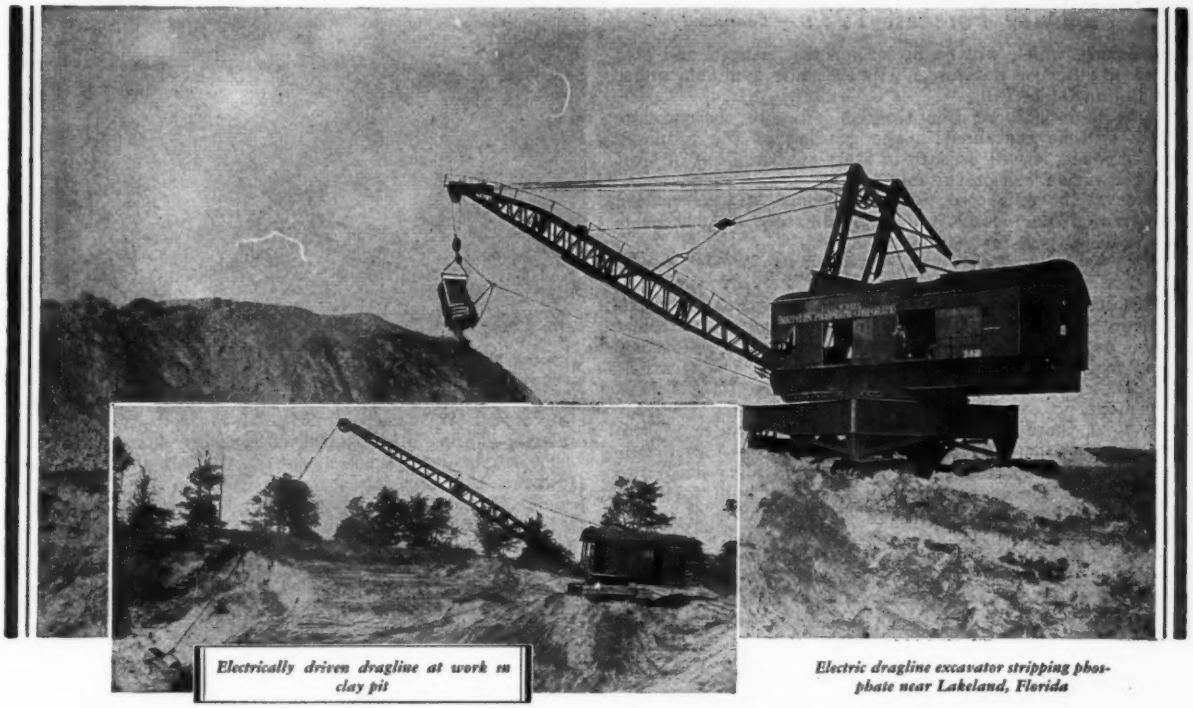
Nevada

A 20% increase over 1930 is estimated for Nevada highway construction, according to present plans.

Following is the proposed program:

New construction	70 miles
Estimated cost	$607,000
Reconstruction	139 miles
Estimated cost	$872,000
Oiled gravel surface	230 miles
Estimated cost	$575,000
Widening existing cement concrete paved highway, using asphaltic concrete for shoulders and new surface	9 miles
Estimated cost	$180,000
Major structures	$175,000

This is the 1931 program as it has been tentatively outlined, but it is very likely that the work will either be enlarged or decreased owing to action taken by the State



Electrically driven dragline at work in clay pit

Electric dragline excavator stripping phosphate near Lakeland, Florida

Tossing the Bucket — *with Electric Drive*

WHERE soft materials such as sand, clay, or phosphate are dug, the dragline shovel can be brought into play with its advantages of wider reach of boom and bucket.

The operator finds that the difficult manipulation of the dragline, up-grade or down, is made appreciably easier because of flexible and smooth power and control—when he has G-E Motorized Power to draw upon through Ward-Leonard control. Electric shovels are noted also for low maintenance cost, dependability, and long, useful life.

In every size, from 1 1/2 to 16 yards, wherever a shovel is needed, G-E Motorized Power, behind the bucket, efficiently and abundantly furnishes driving power for electric shovels. For detailed information, call your local General Electric office or address the General Electric Co., Schenectady, New York.

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Highway Forecast 1931 — *Continued*

Legislature which will be in session this winter, and also as to whether or not funds will be made available under the Colton-Oddie Bill.

It is impossible at this time to estimate the yardage which will be contained in the grading of the proposed highway, but it will be safe to state that at least 35% of the excavation will be suitable for shovel operation.

Excavation contracted this year, which will be carried over into 1931, amounts to approximately 240,000 cubic yards, which will cost $99,100.

New Hampshire

1931 length and quantities are necessarily very approximate in that New Hampshire's field surveys are not completed as yet. In the year 1930, approximately 1,600,000 cubic yards of earth and ledge were moved. The locations for 1931 work would probably require at least 75% as much movement.

In 1930, there was constructed fifty-eight miles of concrete, seven miles of bituminous macadam, one-fourth mile of waterbound macadam and one hundred sixty-five miles of gravel. Of the above mileages there was built forty-one miles of concrete and eight and one-half miles of gravel in conjunction with the Federal Aid. The total expense of construction and reconstruction for 1930 is approximately $4,000,000. The 1931 program should closely approximate the 1930 program as to mileage and expense.

New Jersey

Quarries throughout the country will share largely in the business resulting from the accelerated road program promised to relieve unemployment. Here we catch a glimpse of 1930 activities in the quarry of the Consolidated Stone and Sand Company at Montclair, New Jersey.

The State Highway Commission has not as yet adopted its construction program for 1931. First, due to uncertainty up to this time as to the availability of funds, and, second, because of certain changes that are being recommended by a committee of the Legislature.

It now appears that there will be available for new construction on the New Jersey State Highway System about $36,000,000, which will include right-of-ways, grading, paving, bridges and viaducts. The major portion of work during 1931, it is expected, will be on highly concentrated work such as the approaches to the new Hudson River Bridge and tunnels. There will, of course, be some considerable amount of excavation which will be very largely rock.

No estimates are as yet available of the work that will be performed by the Counties and Municipalities of the State, but the work they will do, including their reconstruction program, will run into several million dollars.

New Mexico

It is expected that the expenditures of the Highway Department for 1930 will be in the neighborhood of $7,000,000. Funds in sight for next year amount to $5,500,000 — Federal Aid appropriation $2,000,000, gasoline taxes estimated $3,000,000, motor vehicle license fees estimated $500,000. However, the Legislature meets early in 1931 and may provide for additional financing for the highway program. It is, therefore, impossible to say at this time whether there will be an increase in highway construction for the coming year or not. In case the Legislature takes no action with regard to the matter of financing, the highway construction program for 1931 will be approximately $1,500,000 less than for 1930.

Grading this highway across the New Jersey hills, William Eisenberg & Sons of Camden used a Bucyrus-Erie Gas + Air Federal Trucks, with a Caterpillar tractor for bulldozing.

New York

During the first nine months of 1930, New York State specified about 10,588,338 cubic yards of unclassified excavation in highway construction, at a cost of approximately $8,881,074.75. The balance of the work to be let this year will increase this amount by about 10% and the expenditures for 1931 will be as great or greater than those for 1930.

North Carolina

North Carolina will have available for 1931 approximately $5,000,000 for new construction and about $5,000,000 for maintenance and betterments. Based on the program of the past year, the State Highway Commission should build the following types: 50 miles of graded road, 75 miles of topsoil and sand-clay, 50 miles of gravel, and 125 miles of paved highways. The program will also include the construction of several large span bridges located at different places in the state.

As the Legislature will meet in January, 1931, it is difficult to surmise what their action will be regarding the issuance of additional bonds for highway work. At the present time, there are approximately 9,400 miles of various types comprising the State Highway System. However, this should be increased, as the next Legislature will very probably authorize additional mileage to be added to the System.

North Dakota

There is some talk of increasing the revenue of the State Highway Department at the coming session of the Legislature. Should this be done, the Highway Department program would, of course, be increased by that amount. At present, total funds for new construction available will be about $100,000 less than in 1930, on account of having to use that much additional for maintenance.

On this basis, the program for 1931 will include approximately 400 miles of grading, involving 400,000 to 440,000 cubic yards of earth excavation, at a cost of about $1,600,000. About thirty miles of reconstruction is included in the above. It is estimated that North Dakota will gravel-surface about 450 miles at a cost of $750,000. No paving is contemplated, but about 50 miles will be given a bituminous surface treatment. The cost of these treatments is approximately $3,500 per mile, or a total of $175,000.

Ohio

The Department of Highways of the State of Ohio advises that it will be impossible to furnish a forecast of plans for 1931. The American Road Builders' Association

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The exceptional capacity of this wire rope to withstand wear and tear is not a matter of chance. It is due to the well known "HERCULES" quality plus the specific advantages of the Patent Flattened Strand Construction.
It is good business to use the kind of equipment that will minimize your operating expense, so why not investigate this remarkable wire rope? It is especially efficient for use on cranes, excavators, shovels and other types of road building machines.
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Highway Forecast 1931 — *Continued*

estimates that Ohio will spend $34,000,000 for state highways in 1931. Nineteen million dollars of this will be for construction, and $18,000,000 for maintenance. A revision of Ohio's gas tax will be under consideration by the next Legislature to provide more for construction.

Oklahoma

The American Road Builders' Association estimates Oklahoma will spend $16,000,000 on state highways for construction and maintenance.

Oregon

No forecast of the road work to be done by the State of Oregon during 1931 can be made at this time other than to say that the total expenditure will be about the same as for 1930.

The total amounts expended during 1930 were as follows: new construction, $3,300,000; betterment, $4,000,000; maintenance, $2,700,000; bond interest and principal repayment, $3,400,000; co-operation on Forest Road Work, $800,000, and all other disbursements, $800,000. This brings the total up to $15,000,000.

Of new construction expenditures, approximately fifty per cent are for grading. Of betterment expenditures, approximately twenty-five per cent are for regrading and grade widening.

In 1930, Oregon graded 160 miles and regraded and widened 140 miles.

Pennsylvania

The program of the Pennsylvania Department of Highways for the 1931 construction season depends, to a large extent, upon the action of the next session of the Legislature, and there is nothing definite that can be stated at this time.

The program of the Department for the present construction season, consisting of 1,300 miles of contract and Department force work, is practically completed, and there will be very little uncompleted contract mileage carried over into the next construction season.

The American Road Builders' Association estimates the Pennsylvania 1931 State highway program at $60,000,000.

Rhode Island

Grading new roads in Rhode Island during 1931 promises to involve expenditure of $135,000 for 23 miles of Federal Aid and four miles of State Roads. Reconstruction of seven miles of Federal Aid and 12 miles of State Roads will probably cost some $95,000, in addition. Excavation involved will require about 270,000 cubic yards on the new work, and 190,000 yards on the reconstruction. About 90% of this will be suitable for shovel work. In addition to the above, 25 miles of paving will probably cost about $900,000. The present program is about the same as that of 1930.

South Carolina

The South Carolina State Highway Department estimates that during the year 1930, approximately 450 miles of hard surfaced roads will be constructed, of which 370 miles will be of the standard concrete pavement type and 80 miles of the bituminous double surfacing type. The expenditures for construction during the year 1930 will amount to approximately $12,600,000.

The 1931 construction program calls for an expenditure of $20,000,000 on the State Highway System. This amount of money will build approximately 550 miles of standard pavement, 260 miles of bituminous surfacing, 280 miles of earth types, and 24,000 feet of bridges.

South Dakota

The program of South Dakota for 1931 is entirely dependent on the action of the 1931 Legislature, and there has been considerable agitation to cut the State program, which is based on approximately the same expenditures as those of 1930. The tentative program includes 140 miles of new grading to cost about $520,000. Of this, 100 miles, costing $400,000, is on Federal Aid roads, and 40 miles, costing $120,000, is on county and local roads. Sixty miles of reconstruction on Federal Aid projects will cost about $300,000. It is expected that the new grading will involve 10,500 yards of excavation, the reconstruction, 8,500 yards. In addition 1,500,000 cubic yards of excavation, to cost $350,000, will be carried over into 1931 on old contracts. Thirty miles of paving is expected to cost $850,000, and 250 miles of graveling, $300,000.

Tennessee

At this time we are unable to give an outline as to Tennessee's program for 1931, since this is dependent upon the action of the Legislature, which meets in January. The American Road Builders' Association estimates that Tennessee will spend $12,000,000 on highway construction in 1931.

Texas

On account of the uncertainty with which highway funds are received, it is impossible to lay out a definite program of construction. The highways in Texas are constructed within the available funds.

The funds that will become available for 1931 will be equal to or slightly less than the amount available during 1930. For this reason, either a program equal to the 1930 program, or slightly less, is contemplated.

The 1930 projects involved an expenditure of $31,799,163, covering construction, surfacing and paving 2,023 miles of highway. Of this, grading and structures on 848 miles cost $7,457,182, 671 miles of concrete cost $16,678,663, gravel, caliche and shell surfacing of 195 miles cost $1,312,664, rock, asphalt and macadam applied to 91 miles cost $970,473, and bridges cost $2,655,579.

Utah

A probable increase of twenty per cent over 1930 is forecast for Utah's 1931 highway program. This is expected to include 120 miles of new construction at a cost of $500,000. Reconstruction is expected to cost $100,000. It is probable that 1,400,000 cubic yards of excavation will be required. In addition, about 375,000 yards on uncompleted contracts will be moved at a cost of about $100,000. Five miles of paving, at a cost of $100,000, and 295 miles of surfacing with gravel or crushed stone, costing approximately $1,000,000, are also included in present plans. Total expenditures for new work in 1931 will probably total about $2,750,000.

Vermont

While no definite program for Vermont can be made until the Legislature meets this winter, it is estimated that road expenditures will parallel those of 1930. On that basis, the tentative program includes 55 miles of new Federal Aid highways costing $2,700,000, 40 miles of State Roads costing $300,000, and 75 miles of local and county roads costing $300,000. Excavation will probably run to approximately 550,000 cubic yards, about 75% of which will be shovel work. Paving will probably total 55 miles and cost $2,550,000, while 40 miles is estimated for surfacing with gravel or crushed stone at a cost of $300,000.

Virginia

The Virginia Department of Highways reports that there is available approximately eleven million for construction and five million for maintenance in 1931 in Virginia. If the general drought bill is passed by Congress, this will be increased one and a half million for construction.

Washington

1930 is the second year of their biennium, and Washington's 1931 program is entirely dependent upon appropriations to be made by the Legislature, which convenes shortly after the first of the year.

In 1930, Washington road contracts included 89 miles of grading, 66 miles of grading and surfacing, 105 miles of surfacing only, 52 miles of concrete paving, 332 miles of oil treatment, 33 bridges. Total contract price, plus ten per cent allowance for overruns, etc., gives estimated cost for this work of $8,909,900.

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Heavy clay or loose sand—the GARST POWER SCRAPER works equally well.... It is the only scraper with an adjustable top. This allows a variation of approximately 40% of its normal capacity. It forces no harmful overload on the hoist—yet it always has leeway for the bigger load. ... The GARST POWER PLOW SCRAPER is an all-purpose scraper. It is the result of many years of experiments and is based on the plow principle that is 4000 years old. ... There are innumerable ways in which GARST POWER PLOW SCRAPERS will cut your excavating costs.
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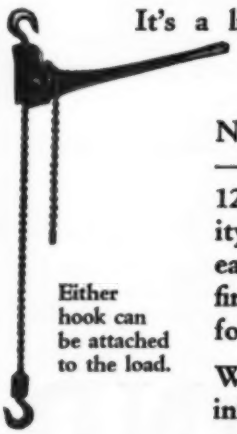

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Highway Forecast 1931 — *Continued*

On the basis of the 1930 figures, The American Road Builders' Association forecasts a total expenditure on Washington State Highways of $12,500,000. It is probable that $9,700,000 of this will be for construction.

Gilbert Construction Company Incorporated of Hendricks, West Virginia had some tough digging in their work on this highway east of Harman. P. L. Gay was Superintendent, S. F. Lanford operator of the Bucyrus-Erie Gas + Air. Indiana trucks were used for hauling.

West Virginia

New grading contracts to be let will total approximately 240 miles, involving about 4,800,000 cubic yards of excavation. Approximately 90% of this will be shovel excavation. The total cost of this grading will be approximately $4,000,000, including drainage. It is estimated that West Virginia's paving program will include new contracts totaling approximately $7,000,000, with a total mileage of approximately 280. The State Road Commission is carrying over from 1930, approximately 1,420,000 yards of excavation, which will cost approximately $639,000. It is probable that Federal Aid will be distributed fairly evenly between grading and paving.

Total funds available for new contracts consist of proceeds of $10,000,000 State road bonds, and $1,324,680 Federal Aid.

The above is all State road work. No figures on county and local road work are available for 1931, but it is probable that the total will involve an expenditure of about $5,000,000.

Wisconsin

A 10% increase over 1930 is shown by present plans for highway construction in Wisconsin during 1931. It is expected that 275 miles of Federal Aid roads will be built, surfaced or paved at a cost of $8,600,000, 325 miles of State roads at a cost of $6,900,000, and 500 miles of county and local roads at a cost of $1,500,000. Reconstruction on State and Federal Aid roads will add another 30 miles, costing $750,000. Excavation will total about 6,000,000 yards — 60% of which will be suitable for shovel work. In addition, 100,000 yards of excavation will be carried over into 1931 on old contracts involving expenditure of about $25,000. Paving of 350 miles is included, to cost about $10,800,000, and surfacing with gravel and crushed stone on 500 miles will probably cost $2,500,000.

Wyoming

Based on the State Highway Bond issue approved by the voters on November 4th, Wyoming will increase highway expenditures in 1931 by 50% over 1930. It is expected that 375 miles of Federal Aid roads will be built at an expenditure of $1,500,000, and involving excavation of 5,250,000 yards. Oil treatment on 450 miles will cost about $800,000, and gravel and crushed stone applied on 425 miles will cost approximately $1,700,000.

! ! ! ! !

Imagine the embarrassment of the St. Paul newsboy who opened the wrong door in the depot waiting room and yelled, "Extra! Paper!"

Canada Forecasts

Alberta

O. L. McPherson, Minister of Public Works, reports that no appropriations will be passed until February, and it is therefore impossible to make any forecast of Alberta's 1931 program at this time.

British Columbia

The Department of Public Works reports that "It is not the policy of the Department to disclose any figures as to public works being carried out in the current fiscal year."

New Brunswick

The Department of Public Works of New Brunswick reports, "It is not consistent with the policy of the Highway Department to give advance information of this nature,

Improving the St. John River Highway in New Brunswick, Canada, contractors Currier and Seymour, of Fredericton, N. B. used several Bucyrus-Erie steamers and a fleet of modern "Iron Mules."

Manitoba

A final agreement was entered into between the Province and the Dominion Government regarding the expenditure of Manitoba's share of the $20,000,000 recently appropriated by the Federal Parliament for unemployment relief. A very large part of the relief money available will be used in improving the highway approaches into Winnipeg, although outlying districts are also to benefit. Of first importance is the completion of the trans-Canada highway and the surfacing of the Pembina highway to the international line.

Ontario

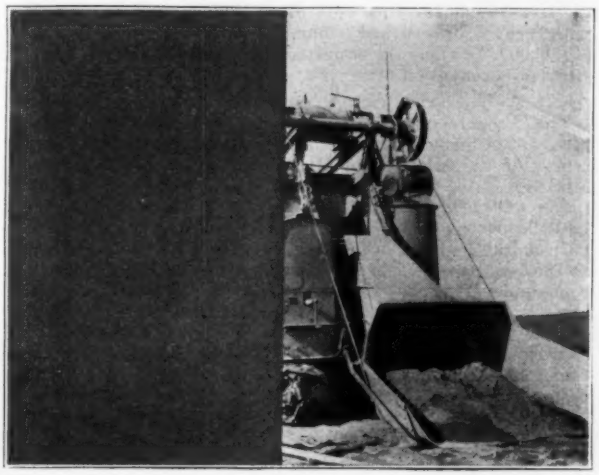
According to a statement issued by the Minister of Highways for the Province of Ontario, expenditures on Ontario roads for 1930 will approximate $8,500,000. Road work and improvements completed or nearing completion, include 235 miles of paving, 165 miles of grading and 14 bridges. Additional work to the value of approximately $1,000,000 was recently authorized bringing the previous total to the figure of $8,500,000.

No efforts on the part of the community, either official or otherwise, have been made public as to plans to be put into operation for rehabilitating or promoting trade and industry, with the possible exception of activities by authorities all over the district towards the construction of highways, and especially one between Fort William and Port Arthur at this end and Sault Ste. Marie at the other. Should this project go through, and there are very good indications that it will as provincial authorities appear to be deeply interested, the funds coming from the Ontario Central Government, it will be a source of great revenue to all places along the proposed route from the immense numbers of tourists and others who would visit the community. As the situation now is, there is no road outlet to the east of the lakehead, and to get here by motor car one must come from the west and return the same way. Should the newly projected highways be constructed there will be very much less unemployment throughout the Fort William and Port Arthur district, as hundreds of men will be in demand in that connection, and naturally wholesale and retail trade in all lines of business will benefit accordingly.

What Does Night Bring to You

DARK *or* LIGHT

COSTS *or* PROFITS?



You can't stop costs on construction jobs by simply shutting down the machinery and letting expensive equipment stand idle.

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With the Novo Flud-Lite Lighting Unit, you get almost daylight lighting for cranes, shovels, pavers, and construction work of all kinds.

The Unit will generate 1000 Watts for eight hours on only one gallon of gasoline. It is exceedingly compact—easy to install—fool-proof in operation—and good for operating at full load continuously.

In addition, the outfit is standard throughout—with standard Novo Timken Roller Bearing equipped Engine—standard generator—and for standard 110 volt lights. Built in sizes ranging from 1¼ to 25 KW. Write for complete details.

NOVO ENGINE COMPANY

222 Porter Street, Lansing, Michigan

Clarence E. Bement, Vice-Pres. and Gen. Mgr.

NOVO

Flud-Lite Lighting Units

In writing to Novo Engine Co. please use post card bound in the center of this number.

neither to advise re work completed until such time as our Annual Report is printed, which is not until about the first of March."

Quebec

The present plans for highway construction in 1931 call for an increase of ten per cent over 1930. During 1931, Quebec plans to grade 1,500 miles of new roads at a cost of $1,500,000; to reconstruct 100 miles at a cost of $2,500; to pave 100 miles at a cost of $1,500,000, and to surface with gravel or crushed stone, 1,500 miles, at a cost of $6,000,000. Grading is expected to require 1,750,000 cubic yards of excavation.

Saskatchewan

The Saskatchewan Government's highway construction program is being carried on apace, according to the recent report of the Minister of Highways of the Province. The Minister stated that the whole allotment of $10,000,000 for roads and bridges, approved at the last session of the Legislature, had been officially endorsed and that his Department had been authorized to carry out the program as soon as possible. Over one-half of the original program was undertaken in three months, the following items amounting to $5,585,000, being listed as authorized expenditures up to September 15, 1930: Provincial highway construction, (a) earth grading, $2,100,000; (b) gravel surfacing, $560,000; (c) maintenance, $1,000,000; (d) colonization roads and secondary highways, $140,000; (e) sundry services, $570,000; main market roads, $600,000; bridges, $470,000; ferries, $145,000.

No forecast can be made for 1931 until the Legislature Assembly, which convenes in January, passes the necessary appropriations.

Iowa Steps Out of the Mud

(Continued from Page 25)

at a good rate of speed and served by only nine Ford trucks. The short hauls, seldom over 100 feet, were, of course, advantageous for working a small number of small trucks, but this concentrating of dump and digging operations so closely together required coordination and alertness on the part of the entire crew in order to avoid confusion and interference.

Foreman H. H. Jahncke who had charge of this dragline work for the J. A. Dunkle Construction Company as well as the finishing crews working with the outfit, was particularly enthusiastic about the Bucyrus-Eries and the Fords.

Foreman Jahncke compliments Bucyrus-Eries and Fords

"They just don't build 'em any better," was his judgment of the 1030's. "In my opinion the Ford truck gives us the highest value per dollar invested. Our depreciation on them is particularly low because of their low initial cost and because, though, as you see, we use them for all they're worth, their trade-in value is high and we can always dispose of them at any time for cash. Upkeep is also low and service always convenient."

Operators Al Holzer and Tom Swart handled the levers of the 1030's.

H. J. Spragg was foreman of the grader outfit ahead of the pavers where four Caterpillar tractors, three elevating graders (Austin, Adams and Stroud), and a 12-foot Adams blade were used.

Foreman Lou Bushbaum had charge of the other dragline outfit with Operator James Tannen on the Sargent.

Bids Invited on Boulder Project

(Continued from Page 29)

elevations on each canyon wall below the dam and power house. The outlet discharge from the reservoir will be controlled by large cylinder gates, hydraulically operated slide gates and balanced needle valves.

The power house will be located immediately downstream from the dam. It will be a "U" shaped structure of concrete and structural steel with one wing of the "U" on each side of the river and with the connecting portion constructed across the down-stream toe of the dam.

The construction of an incline freight elevator located on the Nevada canyon wall, just downstream from the power house, is contemplated, the concrete guide structure to be built under the contract and the elevator car, hoist and control apparatus to be furnished and installed by the Government. Short pieces of highway, leading away from the top of the dam, will be constructed on each side of the river.

Before construction of the dam and power house can be undertaken, it will be necessary to divert the river out of its present channel. The diversion works specified will consist of an upstream cofferdam, a downstream cofferdam, rock protection of a portion of the river channel above the upstream cofferdam, a rock barrier below the downstream cofferdam and four 50-foot diameter concrete lined diversion tunnels in the canyon walls, each about 4,000 feet long through the abutment rock. Two of the diversion tunnels will be located on each side of the river.

The invitation for bids indicates principal items of work and advanced estimated quantities involved as follows:

> 1,800,000 cubic yards of all classes of open cut excavation; 1,900,000 cubic yards of tunnel and shaft excavation; 1,200,000 cubic yards of earth and rock fill in cofferdams and river channel protection; 4,400,000 cubic yards of concrete; 228,000 cubic feet of grout. Drilling 190,000 linear feet of grout and drainage holes. Placing 5,500,000 pounds of reinforcement bar. Installing 1,900,000 pounds of small metal pipe and fittings. Installing 10,600,0000 pounds of structural steel. Installing 20,000,000 pounds of gates, hoists and other metal work.

The invitation for bids does not cover the purchase of materials which are to be furnished by the Government, but the specifications define the materials to be furnished by the contractor and by the Government, respectively.

Before any bid submitted in response to the invitation is considered for award of contract, the Government may require the bidder to submit a statement of facts in detail as to the previous experience of the bidder in performing work of a similar and comparable nature and of the business and technical organization and financial resources and plant of the bidder available and to be used in performing the completed work. The Government expressly reserves the right to reject any bid on which the facts as to business and technical organization, plant, financial and other resources, or business experience justify such rejection.

In the invitation for bids, it is stated that performance of the contract shall begin within 30 calendar days after date of receipt by the contractor of notice to proceed. It is planned to commence the generation of electric power prior to or in advance of the final completion of the dam, and in order to meet the requirements, the specifications provide that each part of the work shall be completed within the number of calendar days after the date of receipt of notice to proceed as follows: The first part is to be completed in 1600 calendar days; the second within 1965 calendar days; and the third within 2565 calendar days.

Three thousand dollars penalty per calendar day delay for each part of the work is provided by the terms of contract.

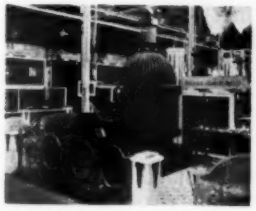
In submitting proposals, each contractor will be required to furnish a bid bond in the amount of $2,000,000. The successful bidder, to whom award of contract is made, will, in addition, be required to furnish a performance bond in the amount of $5,000,000.

Bids will be opened at 10 o'clock a. m., March 4, 1931, at the office of the United States Bureau of Reclamation, Wilda Building, 1441 Welton Street, Denver, Colorado. Copies of the standard forms to be used in bidding and of the final printed edition of plans and specifications will be available about January 10, 1931, and may be obtained from the offices of the Bureau of Reclamation at Washington, D. C., and Denver, Colorado, or Las Vegas, Nevada. A limited number of advance mimeographed specifications are now available and may be obtained by bona fide bidders upon application to the Denver office.

Equipment You Ought to Know About

(Continued from Page 27)

"Yellow Strand" Show in Booth B-87

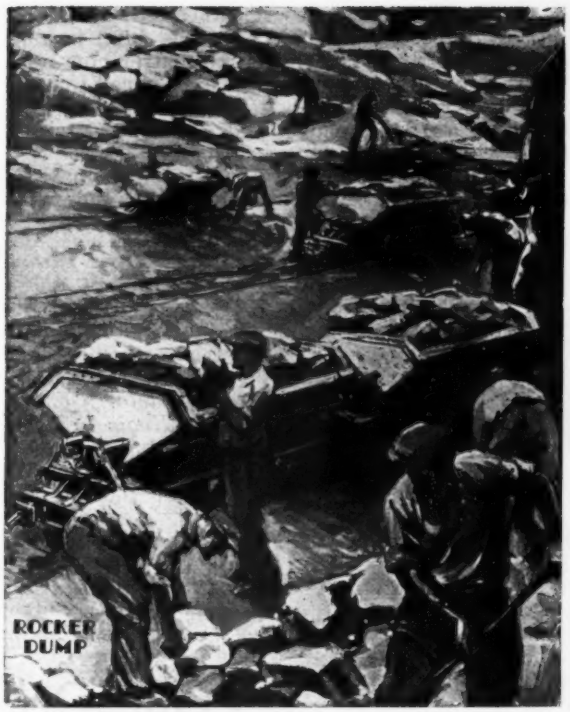


BRODERICK & BASCOM *Rope Company of 4203 North Union Bldg., St. Louis, Missouri,* will exhibit at the Road Show in Booth B-87. "Yellow Strand" Wire Rope and Broderick & Bascom's Highway Guard will be on display. One of the features of the interesting exhibit will be a massive carving set, hand-forged from pieces of "Yellow Strand."

Completely Equipped Linn Tractor at Show

THE *Linn Manufacturing Corporation of Morris, N. Y.,* will exhibit in Booth No. A-106 at the St. Louis Show, a Linn Tractor completely equipped with 100-H. P. Waukesha motor, hydraulic hoist and dump body.

The Linn will be equipped with a second transmission, which is called the high speed reversing transmission, and which permits the Linn to operate at four different speeds in reverse gear, corresponding to its four forward rates. In narrow cuts and fills, this device is especially valuable for



EASTON CARS
FOR EVERY PIT, MINE AND QUARRY
Easton Car and Construction Company
Easton, Penna.

Fast drilling! What is it?

—uninterrupted, day-after-day, month-after-month, year-after-year drilling. That's what cuts drilling costs down.

To get *fast drilling*, you must have a machine which will stand up under strenuous service requirements. The "LOOMIS CLIPPER" is this drill. It has "built in" durability—plus *speed*.

Equipped for manila or steel cable. Either round wheel or crawler type; welded steel or wood frame furnished—all-steel machine if specified.

Write for full information.

THE LOOMIS MACHINE COMPANY
(*Established 1842*)
K Street, TIFFIN, OHIO

Let This Machine Shift and Raise Your Track

Raising the outside rail preparatory to shifting track over to the edge of the dump. All the shifting and raising on this waste dump was done by a few men with the aid of a Track Machine. Wherever track must be shifted or raised and a track gang is maintained, this machine is a real necessity in reducing costs and speeding up work.

Write for Bulletin GR-8.

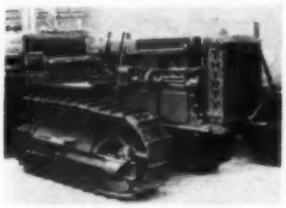
NORDBERG MFG. CO., Milwaukee, Wis.

THE NORDBERG PATENTED
TRACK SHIFTER

the reason that it makes it unnecessary for the Linn to be turned around. Thus the Linn is able to come directly to the shovel, no matter how narrow the cut, and back away in high speed toward the dump. In other cases, it may be of advantage to back toward the shovel and go forward to the dump with the payload.

Descriptive bulletins on Linn tractors may be obtained by writing the manufacturer and mentioning *The Excavating Engineer.*

"Caterpillar" Has Big Showing



THE LARGEST individual exhibit at the annual Road Show will be that of the *Caterpillar Tractor Co., of Peoria, Illinois,* in Space A-26 in Building "A."

The Caterpillar exhibit will include the following equipment: Fifteen Motor Patrol; Fifteen Trailer Patrol; Twenty Plainer; Thirty Leaning Wheel Grader; Sixty Leaning Wheel Grader; Sixty Elevating Grader mounting on a Twenty engine; Super Special Grader; Ten Grader; Sixty with Snow Plow; in addition to seven Caterpillar tractors — Thirty (illustrated); Twenty; Fifteen; Ten; Ten High Clearance; Fifteen with side seat; and Twenty with side seat.

To those who will attend the Road Show at St. Louis — and to others who may be interested — *"Caterpillar" extends a cordial invitation* to visit their plant at Peoria, Illinois, during the week of the Road Show or the week following — January 12 to 24, 1931. During these two weeks, there will be on display a complete showing of "Caterpillar" Tractors, Combines and Road Machinery — and the most comprehensive exhibit ever assembled in one place of the many items of machinery and equipment built by other manufacturers for use with "Caterpillar" Tractors — bulldozers, scrapers, wagons, rock crushers, pole-hole diggers, winches, hoists, stump pullers, air compressors, snow plows, loaders, agricultural implements and other items.

Excellent!

Neighbor (looking over garden fence): "Have your bees done well this year, Robertson?"

Robertson: "Well, they haven't given much honey, but they've twice stung the income tax collector."

POSITIONS WANTED

Space under this heading is available at $5.50 per inch or fraction thereof.

Address all box numbers c/o The Excavating Engineer at South Milwaukee, Wisconsin

SHOVEL OPERATOR

12 years' experience on electric and steam machines in mines. Prefer operating 50-B, 120-B or 170-B anywhere in U. S. A. Can do own repair work and furnish reliable references. Present location, Minnesota. Box 1001.

SHOVEL OPERATOR

10 years' experience on Bucyrus-Erie Gas+Air, gasoline and steam machines on highway, railroad, rock quarry and coal stripping work. Willing to go anywhere in U. S. A. Married. Can do own repairing and furnish best of references. Present location, Missouri. Box 1002.

CLAMSHELL-CRANE-SHOVEL OPERATOR

All around operator with 28 years' experience on railroad, highway and street grading, and sewer excavating. Prefer operating Bucyrus-Erie steam or gas machine. Willing to go anywhere in U. S. A. Married. Can do own repair work and furnish excellent references. Present location, Pennsylvania. Box 1003.

DRAGLINE OPERATOR

10 years' experience on Bucyrus-Erie gasoline and Diesel draglines on levee and drainage work. Will take any dragline job in Middle West. Married. Can do own repairing and furnish reliable references. Present location, Illinois. Box 1005.

DRAGLINE-SHOVEL OPERATOR

8 years' experience on Bucyrus-Erie, Link Belt, Marion and Northwest machines, steam, gasoline and Diesel powered. Have worked on highway and railroad grading, quarry excavation and drainage irrigation. Willing to go anywhere in U. S. A. Also have 2 years' machine shop experience. Can do own repairing and furnish A-1 references. Present location, Florida. Box 1012.

EXPERT DRAGLINE AND SHOVEL OPERATOR

Sixteen years' experience as shovel operator. Single, 36 years of age. Have operated practically all makes of machines, and have 10 years' of experience as dragline operator. Can handle steam, Diesel, electric or gasoline machine. Have worked on highway and railroad grading, rock excavation in quarry, drainage and irrigation and dredging and also gold dredging. Prefer position on Bucyrus-Erie Diesel, E-2, D-2 or 50-B or other Bucyrus-Erie machines. Capable of taking charge of repairing and erecting and can handle crews. Best of references and can do own repairing. At present located in California but will go anywhere except the Tropics. Box 1013.

CLAMSHELL-CRANE-SHOVEL OPERATOR

Experienced on highway and railroad grading, basement excavating and dredging. Prefer operating shovel anywhere in New England states. Married. Can do own repairing and furnish first-class references. Present location, Rhode Island. Box 1007.

CLAMSHELL-CRANE-SHOVEL OPERATOR

10 years' experience on highway and basement excavation. Can operate Gas-Air, gasoline and steam machines. Prefer operating Bucyrus-Erie Type B or B-2 anywhere. Married. Can do own repairing and can furnish good references as operator and mechanic. Present location, W. Virginia. Box 1008.

SHOVEL OPERATOR

Experienced on stripping operations and dam work. Prefer operating Bucyrus-Erie Type B machine anywhere. Married. Can make own repairs and can furnish reliable references. Present location, Pennsylvania. Box 1009.

SHOVEL OPERATOR

15 years' experience on steam machines doing all kinds of construction work, drainage, highway and railroad excavation. Would like to operate Bucyrus-Erie Machine anywhere. Married. Can do own repairing and can furnish excellent references. Present location, Virginia. Box 1010.

SHOVEL OPERATOR

14 years' experience on steam and gasoline Marion, Northwest, and Thew shovels, draglines and cranes on highway, railroad grading and quarries. Prefer Bucyrus-Erie or Northwest, anywhere in U. S. or Canada. Can do own repair work and all overhauling. Single and sober. Box 1011.

SHOVEL OPERATOR

25 years' experience on Bucyrus-Erie 250-B and 20-B on railroad, canal and highway work. Can do his own repair work and furnish reliable references. Will go anywhere in U. S. A. Present location, Pennsylvania. Box 1004.

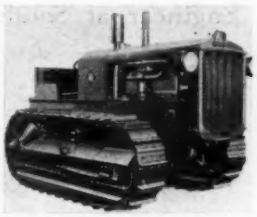
CLAMSHELL-CRANE-SHOVEL OPERATOR

Four years' experience operating gasoline machines on highway and bridge construction work. Prefer working in central states. Married. Can do own repairing and furnish A-1 references. Present location, Indiana. Box 1014.

SHOVEL OPERATOR

4 years' experience on Bucyrus-Erie and Link Belt gasoline and steam machines on railroad dump-car loading; and on general excavating. Prefer working in Texas but will go anywhere. Single. Can do own repairing and furnish A-1 references. Present location, Texas. Box 1006.

Monarch Tractors in Allis-Chalmers Display



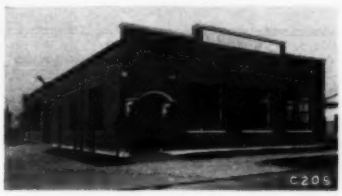
THE *Allis - Chalmers Manufacturing Company* will display at the 26th National Road Show at St. Louis the following equipment: A narrow tread, a solid tired and a pneumatic tired Model "U" Ind"U"strial tractor; pneumatic tired Model "U" Ind"U"strial tractor; a Monarch "35," a Monarch "50" and a Monarch "75."

The Monarch "35," built to supply the demand for a medium-sized, compact, track-type tractor of modern design, will be the featured machine and is illustrated here.

For printed literature on Monarch tractors write *Allis-Chalmers Manufacturing Company, Monarch Tractors Division, Springfield, Illinois.*

TRADE NOTES

Bucyrus-Erie Company, South Milwaukee, Wisconsin, recently opened the new Detroit Sales and Service Station shown in the accompanying illustration. It is located at 10425 Northlawn Avenue. The convenient location, carefully planned and well arranged quarters with the ample stock of repair parts will be of distinct advantage to contractors in and around Detroit. H. A. Titus, District Sales Manager for the southern peninsula of Michigan and the northwest part of Ohio is in charge. Other Bucyrus - Erie representatives located in the new offices include G. E. Peterson and Joseph Waldinger.



"My wife says if I don't chuck golf she'll leave me."
"Hard luck, old chap."
"Yes—I'll miss her."

FOR SALE

Space under this heading is available at the following rates, payable in advance of publication:

1 to 3 inches	$5.50 an inch net
Over 3 to 7 inches	5.25 an inch net
Over 7 to 14 inches	5.00 an inch net

An inch is measured vertically on one column—three columns to a page. Any space may be used measured by the even inch in height and by one, two or three columns in width.

The price per inch is based on total space used—multiply ad. space by number of continuous insertions.

Address all box numbers c/o The Excavating Engineer at South Milwaukee, Wisconsin

Small Draglines
Under 2 yards

MARION ELECTRIC SHOVEL, Model No. 36. **MARION STEAM SHOVEL**, Model No. 36. Location Central Ohio. Box 1204-A.

TYPE "B" ERIE STEAM SHOVEL, caterpillar mounted, equipped with 21-foot boom, 18-foot dipper handle, boom hoist, ¾-cubic-yard dipper; sold new 1924; just completely overhauled; price reasonable; located vicinity of Chicago. Box 41-SS.

NORTHWEST SHOVEL, model 105, caterpillar mounted. 24-foot boom, 1-cubic-yard dipper, 16-foot dipper handle. In good condition. Price $4,500, f. o. b. Utica, New York. Box 34-SS.

RECONDITIONED TYPE B ERIE HIGH LIFT SHOVEL, shop number 3175, mounted on spur gear caterpillars, equipped with 19-foot 9-inch boom, 16-foot dipper handle, ¾-cubic-yard dipper, boom hoist, two-speed travel mechanism. Box 87-SS.

MODEL No. 21 MARION STEAM SHOVEL, high lift boom and forward drum, in excellent condition, boiler just retubed, location Baltimore. Price **$5,000.00**. Address Box 1101.

RECONDITIONED TYPE-A ERIE STEAM SHOVEL on caterpillars, ⅝-cubic-yard dipper, 16-foot boom, 13-foot dipper handle, boom hoist, Massachusetts boiler. Machine thoroughly inspected, worn parts replaced. Guaranteed to be in first-class operating condition. Will rent or sell. Box 37-SS.

ONE NORTHWEST SHOVEL, 28-foot boom, 16-foot dipper handle, 1¼-cubic-yard bucket, 90 h.p. Twin City motor, new caterpillar, new boom, open cab, purchased late 1925, machine in good working condition and can be demonstrated at any time—price around $5,000. Box 113-SS.

SLIGHTLY USED, RECONDITIONED AND GUARANTEED BUCYRUS-ERIE D-2 DIESEL DRAGLINE, 45-foot boom. Also 1-yard dragline bucket and Delco Lighting plant. Would rent for long period with option of purchase. Located Southern Indiana. Box 130-SS.

TWO TYPE "B" ERIE STEAM MACHINES, mounted on "cats," ¾-cubic-yard dippers, shop numbers 2300 and 2301, 19-foot booms and 16-foot dipper handles. Box 83-SS.

31-B STEAM SHOVEL, Number 4880, in very good condition; priced right; located Pittsburgh, Pennsylvania. Box 128-SS.

BUCYRUS-ERIE GAS + AIR SHOVEL, shop number approximately 9800, equipped with 22-foot 6-inch boom, 16-foot dipper handle, one-cubic-yard inserted tooth dipper, power boom hoist. Mounted on a single shaft caterpillar-type mounting. Has moved only 40,000 yards of material. Located vicinity of Poughkeepsie, New York. Box 96-SS.

REBUILT GA-2 ERIE SHOVEL mounted on new single shaft caterpillar, 1-cubic-yard inserted tooth dipper, 22-foot 6-inch boom, 16-foot dipper handle, starter. Carries guarantee of new machine. Box 43-SS.

TYPE "A" ERIE STEAM SHOVEL, shop number about 1900, caterpillar mounted, 16-foot boom, 14-foot dipper handle, ⅝-cubic-yard dipper, boom hoist. In first-class condition. Located Chicago vicinity. Priced to sell. Box 69-SS.

TYPE "B" ERIE STEAM SHOVEL, caterpillar mounted equipped with 21-foot 3-inch boom, 18-foot 6-inch dipper handle, power boom hoist, ¾-cubic-yard dipper; in excellent condition; just installed $400 worth of repairs. Located vicinity Kansas City. Box 80-SS.

NORTHWEST DRAGLINE, Model 105, shop number in 2000's; 45-foot boom, fairlead and no bucket. In good condition, **$5000.00**. For further particulars address communications to Box 114-SS.

OSGOOD GASOLINE DRAGLINE, 1¼-cubic-yard bucket, 22-foot boom, 16-foot dipper handle, manganese front dipper, 4-cylinder Le Roi motor, 125 h.p., 45-foot boom, fairlead, no bucket, **$6000**. For further particulars address communications to Box 115-SS.

P. & H. SHOVEL, Model 600, 21-foot boom, 14-foot dipper handle, 1-cubic-yard bucket, on caterpillars, purchased November 1928, shop number 2989—machine is now being thoroughly overhauled and can be demonstrated in about a week. Box 116-SS.

ONE P. & H.-204 ½-CUBIC-YARD COMBINATION GAS SHOVEL AND CLAMSHELL, shop number about 2220. New 35-foot clamshell boom, and ½-cubic-yard Owens Bucket. Machine is in good condition and has had the best of care. Can be inspected in operation in Milwaukee. Priced to sell quickly. Box 99-SS.

MARION MODEL 37 ELECTRIC SHOVEL suitable for 3-phase, 60-cycle, 440 volts, equipped with 32-foot boom, 22-foot handles, and 1¼-cubic-yard dipper, on caterpillar mounting. Machine in very good condition. Located near Pittsburg, Kansas. Price reasonable. Box 90-SS.

ORTON SHOVEL, new 1928. 16-foot 4-inch boom, 12-foot dipper handle. ⅝-cubic-yard dipper. Located Seattle, Washington. Box 100-SS.

RECONDITIONED TYPE-B SHOVEL, number 3175, spur gear caterpillar-mounted, 19-foot 9-inch boom, 16-foot dipper handle, ¾-yard dipper, power boom hoist. Located Detroit. Price right. Box 132-SS.

REBUILT BUCYRUS-ERIE TYPE B-2 SHOVEL, shop number about 4000, spur gear caterpillar-mounted, 19-foot 9-inch boom, 16-foot dipper handle, ⅞-cubic-yard inserted tooth dipper and power boom hoist. Fully guaranteed. Box 133-SS.

SLIGHTLY USED, RECONDITIONED AND GUARANTEED BUCYRUS-ERIE 1030 SHOVEL, gasoline rope crowd, extra high lift, with 40-foot boom, clamshell and dragline equipment, also drag shovel equipment. Excellent condition. Price right. Located Western Pennsylvania. Box 134-SS.

USED NORTHWEST SHOVEL, 24-foot boom, 15-foot dipper handle, 1-cubic-yard dipper, equipped with 4-cylinder, 6¼ in. x 8¾ in., Atlas Diesel Engine. Good operating condition. Located San Francisco. Price right. Box 135-SS.

MARION TYPE 32 COMBINATION DRAGLINE AND SHOVEL, shop number 5683, dragline boom 50 feet, one-cubic-yard drag bucket included. Shovel boom 24 feet, dipper handle 17 feet 6 inches. Manganese front dipper 1¼ cubic yards. Machine purchased new October 1926, original cost $17,500. Will sacrifice and offer terms to reliable party. Located in vicinity of San Antonio, Texas. First-class condition. Address Box 1004-A.

FOR SALE

Address all box numbers c/o The Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 yards
Continued

ONE P. & H.-400 ¾-CUBIC-YARD GAS SHOVEL—shop number about 3650, equipped with oversize motor and reinforced boom. Machine is one year old, and has seen very little service. Located in Southern Wisconsin. Box 98-SS.

MARION MODEL 32, shop No. 5459, mounted on "cats," steam-powered, 1½-cubic-yard dipper, 24-foot boom, 17-foot 6-inch dipper handles. Box 82-SS.

TYPE "A" ERIE STEAM CLAMSHELL MACHINE, mounted on traction wheels, equipped with 26-foot boom; to operate ½-yard bucket; shipped new 1921. Located southern Iowa. Priced very reasonable. Box 31-SS.

MODEL 20-B BUCYRUS GASOLINE SHOVEL AND CLAMSHELL MACHINE, shop number in 4800 series; mounted on full caterpillar; equipped with high lift gooseneck shovel boom and ⅞-cubic-yard dipper, also 36-foot clamshell boom and ¾-cubic-yard clamshell bucket. Machine in good working condition. May be inspected at Omaha. Reasonably priced. Convenient terms may be arranged. Box 55-SS.

BUCYRUS 30-B STEAM MACHINE, shop number 3578. Has seen approximately eight years' service. Equipped with new boom and boiler. Reasonably priced. Located New York State. Box 72-SS.

MARION MODEL 7 ONE-YARD STEAM SHOVEL. Shop number around 6000. Good condition. Price $5,000. Box 101-SS.

TYPE "B" ERIE HIGH-LIFT SHOVEL. Shop number about 1115. 19-foot 6-inch boom, 16-foot dipper handle, ¾-cubic-yard bucket, Caterpillar mounted. In good operating condition. Cheap. Location Central Illinois. Box 104-SS.

NEW Type E-2

Bucyrus-Erie Diesel-operated 1½-cubic-yard shovel and dragline. VERY LATEST MODEL—NEVER USED—BARGAIN PRICE. Box 136-SS.

BYERS "BEAR CAT" COMBINATION 1½-CUBIC-YARD

Shovel and clamshell crane; shop number about 2975; new 1926. Equipped with 34-foot boom. Machine has had good care and is in good working order. Located upper Michigan. Box 137-SS.

ONE 18-B BUCYRUS, ⅞-yard dipper on full revolving caterpillars. Box 505-A.

SLIGHTLY USED, RECONDITIONED AND GUARANTEED BUCYRUS-ERIE 1030 DIESEL DRAGLINE, 40-foot boom, also ¾-yard Class "C" drag bucket. Would rent for long period with option of purchase. Located Western Pennsylvania. Box 131-SS.

RECONDITIONED TYPE B SHOVEL, shop number approximately 3100, caterpillar mounted, ⅝-cubic-yard inserted tooth dipper, 19-foot 9-inch boom, 16-foot dipper handle, power boom hoist. Guaranteed. Will rent with option to purchase. Located Western Pennsylvania. Price on application. Box 40-SS.

OSGOOD HEAVY-DUTY, GASOLINE-DRIVEN, 1-YARD COMBINATION DRAGLINE-CLAMSHELL MACHINE, on cats, equipped with 40-foot boom, 6-cylinder Beaver motor, starter and lighting plant operating from generator. Machine 2 years old. Located Central Illinois. Priced to sell. Address Box 1106.

TYPE "B" ERIE STEAM SHOVEL, shop number 2019, mounted on new caterpillar type traction purchased late, spring of 1929. Equipped with new 19-foot 9-inch boom, 16-foot dipper handle and ⅝-cubic-yard dipper. First-class condition. Price $3,750 F. O. B. Louisville, Kentucky. Box 12-SS.

OSGOOD STEAM SHOVEL, 1¼-cubic-yard dipper, caterpillar mounted. Shop number 1397, priced f. o. b. cars, Summittville, Tennessee. Box 86-SS.

ERIE TYPE "GA-2" GAS + AIR SHOVEL, shop number 4117, mounted on spur gear drive caterpillar trucks, and equipped with a 24-foot boom; 18-foot, 4-inch dipper handle; 1-cubic-yard manganese cast front socket inserted tooth dipper; power boom hoist; air self-starter, and all equipment and appurtenances in accordance with the specifications of the Bucyrus-Erie Company, f.o.b. cars shipping point Virginia. Box 126-SS.

UNIT ½-CUBIC-YARD GAS SHOVEL, full revolving. New June 1930. In excellent condition throughout and priced exceptionally low. Located in Northern Wisconsin. Box 127-SS.

MODEL 700 P. & H. 1¼-cubic-yard gas shovel, shop number 3101, chain crowd, 21-foot 7-inch boom, 16-foot dipper stick, purchased May 1928, price about $6,000. Located near Schoharie, N. Y. Box 117-SS.

Small Draglines
Under 2 yards

30-B DIESEL DRAGLINE with 40-foot boom and 1-cubic-yard bucket located in Alabama. Box 91-SD.

SARGENT DRAGLINE with 45-foot boom, 1¼-cubic-yard Page bucket on cats. Machine in good working condition. Located in Central-Eastern Illinois. Price $3500.00. Address Box 1103.

If You Do Not Find What You Want Listed—Write Us

The Excavating Engineer
South Milwaukee, Wis.

30-B DRAGLINE, shop number about 4470, mounted on caterpillars with 40-foot boom and 5-foot extension, 1-cubic-yard Page Class-C bucket and electric light plant. Good working condition, location Detroit District, and ready for prompt delivery. Box 121-SD.

FOR SALE

MODEL 208 P. & H. DRAGLINE (shop number about 1760), equipped with 45-foot boom, 1-yard drag bucket, including about $200 worth of repairs; located vicinity of Indianapolis. Priced to sell quick. Address Box 601.

MODEL 206 P. & H. DRAGLINE, caterpillar-type mounting, 38-foot boom and 5-foot extension. Recently overhauled and new Waukesha engine installed. Can be inspected in operation in Omaha, Neb. Box 79-SD.

MARION MODEL 261 DRAGLINE with shovel equipment. Shop No. 3277. Truck mounted. Recently overhauled and rebuilt. In excellent condition. Located near Minneapolis, Minnesota. A number of extra parts with the machine. Priced very reasonable for immediate sale. Address Box 606-A.

Small Clamshells and Cranes
Under 2 yards

MODEL T ORTON GAS-DRIVEN CLAMSHELL MACHINE, caterpillar mounted, equipped with 35-foot boom, no bucket. Machine about three years old and in good repair; working every day. Shop number near 47,590. Priced to sell. Located in Southwestern Michigan. Box 18-SCC.

BYERS GASOLINE ONE-HALF SWING, 30-FOOT BOOM CLAMSHELL EXCAVATOR, including ½-cubic-yard Williams clamshell bucket and trench hoe equipment, powered with Hercules motor. Machine about 4½ years old. Price complete, machine f. o. b. present location vicinity Buffalo, New York, **$2,500.00.** Box 66-SCC.

BUCYRUS 30-B STEAM CLAMSHELL-CRANE, 45-foot boom. Good operating condition. Priced reasonable. Located New York. Box 36-SCC.

MODEL 20-B BUCYRUS GASOLINE CLAMSHELL MACHINE AND SHOVEL, shop number in 4800 series; mounted on full caterpillars; equipped with 36-foot clamshell boom and ¾-cubic-yard clamshell bucket; also a high lift gooseneck shovel boom and ⅞-cubic-yard dipper. Machine in good working condition. May be inspected at Omaha. Reasonably priced. Convenient terms may be arranged. Box 55-SCC.

BYERS "BEAR CAT" 1½-CUBIC YARD COMBINATION

Clamshell crane and shovel; shop number about 2975; new 1926. Equipped with 34-foot boom. Machine has had good care and is in good working order. Located upper Michigan. Box 137-SCC.

Large Shovels and Draglines
2 yards and over

1 70-C BUCYRUS, 2½ or 3-yard dipper, on caterpillars. Steam.

175-B ELECTRIC BUCYRUS COMBINATION DRAGLINE AND SHOVEL, 3-phase, 60-cycle, 440 volts, 3½-yard bucket. Box 505.

50-B DIESEL DRAGLINE. New September, 1928; shop number about 10,075. Has 60-foot boom, 1¾-cubic-yard bucket; Kohler light plant. Located near New Madrid, Missouri. In excellent condition. Priced very reasonable for quick sale. Box 122-LSD.

175-B BUCYRUS STEAM SHOVEL, equipped with 75-foot boom, 48-foot dipper handle and 4-yard dipper. Machine located near Pittsburg, Kansas, and can be inspected at any time. Condition good; price open. Box 118-LSD.

50-B STEAM DRAGLINE, shop number about 4157, mounted on caterpillars and equipped with 50-foot boom and 13-foot extension. One-yard Williams Clamshell bucket and 1½-cubic-yard Page Class-C drag bucket, boiler retubed and machine equipped with electric light plant. Good working condition, location Detroit District, and ready for prompt delivery. Box 129-LSD.

TWO 70-C SHOVELS, mounted on cats. In good condition. Priced to sell. Address Box 614.